RESULTS OF SUBSURFACE EXPLORATION PROGRAM FOR MONITORING WELL PLACEMENT AT HUDSON RIVER DREDGE DISPOSAL SITES:
- SPECIAL AREA 13
- BOUY 212

Prepared by

New York State Department of Transportation

Soil Mechanics Bureau

for

New York State Department of Transportation

Waterways Maintenance Division

August 1990

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NYSDOT
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I. INTRODUCTION

In the mid to late 1970's, river sediments containing polychlorinated biphenyls (PCBs) were dredged from the upper Hudson River in the Fort Edward area and placed in several disposal sites in the vicinity. Two such sites, Special Area 13 and Bouy 212, are the subject of this report.

Special Area 13 (SA-13) and Bouy 212 (B-212), owned and maintained by the New York State Department of Transportation (NYSDOT), are located on the banks of the Hudson River. They were last used to store dredging spoils in 1979, at which time they were capped with 12 inches of topsoil and seeded. Yearly contracts are let by NYSDOT to maintain the turf cover and mow the grass.

Groundwater monitoring wells were installed at the two sites in 1979. Their purpose was to allow water samples to be extracted and tested for PCB concentrations, thereby gauging PCB levels leaching from the sites into the groundwater. These wells were subsequently replaced between 1981 and 1984, reportedly because they dried or experienced turbidity.

The existing monitoring wells are located both upgradient and downgradient of each site. Since 1980, groundwater samples from the wells have been tested an average of about four times per year. PCB concentrations have ranged from non-detectable to 66 parts per billion (ppb).

The U.S. Environmental Protection Agency (EPA) has suggested that water samples taken from the monitoring wells at disposal sites SA-13 and B-212 may not represent the actual concentration of PCBs leaching into the groundwater, and that additional wells may be needed. The reasoning being that the wells may not be located at the depths which contain the highest PCB levels. Because PCBs are "sinkers" (heavier than water), they could theoretically be descending through granular soil, where the wells are currently located, down to a layer of relatively impervious soil. Once the PCBs encounter this layer, they might concentrate at the surface of the layer, or migrate either in the direction of groundwater flow or in the direction of the downward slope of the impervious soil.

In April, 1990, a soils exploration program was instituted at SA-13 and B-212 to determine the elevation of impervious soil. Malcolm-Pernie Inc. (MPI) acted as Project Consultant and decided where the borings would be located. A representative from EPA was present during the drilling operations to determine the depth to which the borings would be progressed. Empire Soils Investigations performed the boring and sampling operations. Engineers and geologists from the New York State Department of Transportation Soil Mechanics Bureau (SMB) were present to collect soil samples and record visual descriptions of the soil encountered.

Using the data obtained from the boring program, as well as information from the existing wells, the Soil Mechanics Bureau generated subsurface profiles of the two sites. These profiles, included in Appendix A, identify the locations of the impervious soil strata. Hydrogeologic evaluations of the disposal sites, and recommendations concerning additional monitoring wells are presented herein.

II. LOCATION OF SITES

The Hudson River dredge disposal sites, Special Area 13 (SA-13) and Bouy 212 (B-212), are located in the Hudson-Champlain Lowlands Physiographic Province in New York State. Both sites are on the banks of the Hudson River within the river's flood plain: Site SA-13 is on the west bank in the Town of Moreau, Saratoga County, and Site B-212 is on the east bank in the Town of Fort Edward, Washington County. Both areas are approximately 45 miles north of Albany, NY.

III. GEOLOGIC HISTORY OF SOIL DEPOSITION IN THE AREA

In the waning years of the Pleistocene Epoch (Ice Age), the retreating Hudson Ice Lobe of the Wisconsin glacial advance supplied water to ice-marginal Lakes Albany and Quaker Springs. Melting soil-laden ice contributed a large sediment volume to the lake bottom, and a characteristic lacustrine sequence was deposited.

A bottom layer of interbedded gravel and sand underlies the stratified clay and silt lacustrines. Over these layers are deltaic silt and sand beds, which were deposited in shallow-water portions of the lake basin. Major tributaries transported large sediment volumes, and significant deltas were formed.

Further recession of the glacier, and an accompanying drop in water level, led to the transition from Lake Quaker Springs to Lake Coveville. Sediment contribution to this lake in the Hudson Lowland was limited to the pebble gravel, sand and silt transported by tributary streams.

In the latter stages of deglaciation drainage through this area, three separate water levels were formed, known as the Fort Ann Channels. They are considered a broad shallow river, 10 to 20 feet deep, with a significant south-flowing current capable of eroding the soft lacustrine bottom sediment and transporting sand. Tributary streams deposited fluvial-lacustrine sand where they joined the Fort Ann waters, and the prevailing current transported this sand southward, depositing it on eroded clay terraces and till/bedrock surfaces.

Ordovician sandstone and shale bedrock underlie this area.

Disposal sites SA-13 and B-212 exhibit generally similar stratigraphy. Soil borings at these sites substantiate the depositional process described above. The borings show that silts, sands and gravels from the Lake Coveville and Fort Ann events overlie layered silt and clay and silty clay deposits of the Lake Quaker Springs event. The following section of this report contains more detailed descriptions of the subsurface soil profiles for each site.

IV. SOIL AND HYDROGEOLOGIC CONDITIONS AT DISPOSAL SITES

A. SITE BOUY 212 (B-212)

1. General Soil Conditions

The general soil conditions at this site were determined through the interpretation of subsurface exploration logs and visual examination of soil samples from bore holes D-1, D-2, DNX-5 and DNX-6. These conditions are listed in Table 1, and shown on Drawing No. 1-SM-2320-D, "Bouy 212 General Subsurface Profile" in Appendix A.

2. **Hydrogeology** - Based on groundwater elevations taken in the borings and monitoring wells at this site, the phreatic surface slopes downward to the south in the direction of river flow, and west toward the Hudson River.

Soil strata containing clay occur at two distinct locations. The upper layer was found in the North at Elevation 118.5 and slopes down to the south to Elevation 99.5. At the northeast corner of the site, this layer is divided by a five feet thick deposit of silt and sand.

The lower clay-bearing stratum slopes from the North at Elevation 91 to the South at Elevation 89 (Appendix A, Drawing No. 1-SM-2320-D, Section A-A). This layer also slopes down to the west, toward the river.

Based on other subsurface explorations completed in this area (Fort Edwards Bridge over the Canal, and Special Area 13), it may be reasonable to assume that the lower clay-bearing layer is continuous. There is, however, a degree of uncertainty as to the continuity of the upper clay layer.

In summary, the groundwater flow characteristics at this site tend to be toward the south and west during normal and low river levels. Groundwater recharge from the river may occur occasionally for short time intervals when the river level is high.

B. SITE SPECIAL AREA 13 (SA-13)

1. General Soil Conditions

The general soil conditions at this site were determined through the interpretation of subsurface exploration logs and visual examination of soil samples from bore holes C-1 through C-4, and DNX-1 through DNX-4. These conditions are listed in Table 2, and shown on Drawings Nos. 1-SM-2320-E and 1-SM-2320-F in Appendix A.

2. **Hydrogeology** - Based on the groundwater elevations recorded in the borings and monitoring wells at this site, the phreatic surface slopes gently southeast towards the Hudson River. Parallel to the river, the groundwater surface dips very gently south-southwest, in the direction of river flow.

TABLE 1
BORING LOG SUMMARY
SITE B-212

LAYER THICKNESS* (feet)	RANGE OF ELEVATIONS* (feet)	COMPACTNESS OR CONSISTENCY	SOIL DESCRIPTION
11-18	131-112	Very Loose to Medium Compact	Brown and Black Sandy SILT and Silty fine SAND
2-12	120-100	Very Loose to Medium Compact	Gray, Brown and Black Gravelly SAND to Silty SAND, Gravelly
1-15**	118.5-98.5	Very Soft to Soft	Layered: Gray and Gray/Brown Silty CLAY Clayey SILT fine Sandy SILT
10-13	104-89	Very Loose to Medium Compact	Brown and Black Sandy SILT and Silty fine SAND
0-6	91-85	Very Soft to Soft	Layered: Gray and Gray/Brown Silty CLAY Clayey SILT fine Sandy SILT
6-7	89-79	Very Soft to Firm	Gray and Gray/Brown Clayey SILT and Silty CLAY

- LOWER LIMIT OF BORINGS -

* LAYER THICKNESS and RANGE OF ELEVATIONS are based on multiple borings.

LAYER THICKNESS represents the minimum and maximum thickness of a soil deposit recovered from the borings at the site.

RANGE OF ELEVATIONS represents the highest elevation at which the top of a soil deposit was encountered, and the lowest elevation at which the bottom of a soil deposit was encountered, from the borings at the site.

** At northeast corner of site, five feet of Sandy SILT and Silty fine SAND was found within the layered CLAY and SILT described above.

The top of the clay-bearing strata was found to drop from Elevation 108 at the northeastern (upstream) end of the site, to Elevation 92 at the southwestern (downstream) end of the site.

The groundwater flow characteristics at this site appear to be southeast toward the river , and south-southwest in the direction of river flow. This will occur during normal and low river stages. Groundwater recharge from the river may occur occasionally for short time periods when the river level is high.

TABLE 2

BORING LOG SUMMARY
SITE SA-13

LAYER THICKNESS* (feet)	RANGE OF ELEVATIONS* (feet)	COMPACTNESS OR CONSISTENCY	SOIL DESCRIPTION
24-36	133-92	Very Loose to Medium Compact	Gray, Brown and Black Sandy SILT Silty fine SAND Gravelly SAND Silty SAND, Gravelly
5-13	108-79	Very Soft to Soft	Layered: Gray and Gray Brown Silty CLAY Clayey SILT, and fine Sandy SILT
0-4.5	97-92.5	Very Soft to Firm	Gray and Gray/Brown Clayey SILT and Silty CLAY

- LOWER LIMIT OF BORINGS -

* LAYER THICKNESS and RANGE OF ELEVATIONS are based on multiple borings.

LAYER THICKNESS represents the minimum and maximum thickness of a soil deposit recovered from the borings at the site.

RANGE OF ELEVATIONS represents the highest elevation at which the top of a soil deposit was encountered, and the lowest elevation at which the bottom of a soil deposit was encountered, from the borings at the site.

V. DISCUSSION OF EXISTING WELLS

Late in 1979, a total of six wells were installed at the two dredge disposal sites: DNX-5 and DNX-6 at Site B-212, and DNX-1 thru DNX-4 at Site SA-13 (see Appendix A, Drawing Nos. 1-SM-2320-A, B and C). They were to be used to monitor PCB concentrations in the groundwater around the perimeter of the sites. Personnel from New York State Department of Environmental Conservation (NYSDEC) and NYSDOT determined the location of the wells.

Soil samples were collected while progressing the borings, and Subsurface Exploration Logs were prepared for each hole. These logs are included in Appendix B.

A three inch inside diameter slotted plastic pipe was installed in each well, five feet below the recorded groundwater elevation. The depths of wells and water levels at the time of installation were as follows:

TABLE 3

ORIGINAL WELLS: DEPTHS AND GROUNDWATER ELEVATIONS

Site	Well No.	Ground Elevation (ft.)	Depth of Well (ft.)	Depth to Groundwater (ft.)
SA-13	DNX-1	121.4	6	1
SA-13	DNX-2	124.7	9	4
SA-13	DNX-3	121.9	10	5
SA-13	DNX-4	128.9	7	2
B-212	DNX-5	127.9	8	3
B-212	DNX-6	121.8	7	2

Around the end of 1980, DNX-4 and DNX-5 went dry. Over the next two years, problems such as high turbidity affected the other wells. By February, 1984, all six wells were replaced.

The replacement wells were installed close to the original well locations. Although correspondence indicates that Subsurface Exploration Logs for the new wells were transmitted to the appropriate offices, no such logs can be located.

The depths of the replacement wells, and their respective groundwater elevations, were measured on May 1, 1990. The data was recorded as follows:

TABLE 4

REPLACEMENT WELLS: DEPTHS AND GROUNDWATER ELEVATIONS

Site	Well No.	Ground Elevation (ft.)	Depth of Well (ft.)	Depth to Groundwater (ft.)
SA-13	R-1	121.3	10.15	0.70
SA-13	R-2	125.3	10.66	4.36
SA-13	R-3	121.7	11.55	0.92
SA-13	R-4	125.3	18.71	2.35
B-212	R-5	131.1	18.85	7.40
B-212	R-6	122.4	11.60	1.85

NYSDEC had conducted inspections and monitoring surveys at both sites from October 1, 1980 through March 31, 1989. Since then, NYSDOT has assumed responsibility for the laboratory analysis of samples taken from the wells. NYSDEC continues to perform sample collection, with the assistance of personnel from NYSDOT. The wells have been monitored an average of four times annually.

TABLE 5

SUMMARY OF HIGHEST PCB RESULTS FROM WELL SAMPLES

HIGHEST P.C.B. READING PER YEAR (ug/l=ppb)						
	SPECIAL AREA 13				BOUY 212	
YEAR	WELL #1 (DNGRD.)	WELL #2 (DNGRD.)	WELL #3 (DNGRD.)	WELL #4 (UPGRD.)	WELL #5 (UPGRD.)	WELL #6 (DNGRD.)
1980	2.40	NST	2.90	NST	NST	12.00
1981	0.05	0.19	11.00	22.00	5.20	66.00
1982	NST	2.30	2.50	LT 0.08	LT 0.07	17.00
1983	NST	NST	NST	NST	NST	NST
1984	0.06	0.06	0.34	1.10	0.06	0.82
1985	LT 1.00	LT 0.50	LT 0.50	LT 1.00	LT 0.50	6.80
1986	3.80	ND	ND	ND	ND	5.00
1987	ND	ND	ND	ND	ND	ND
1988	1.40	LT 0.05	LT 0.05	LT 0.05	LT 0.05	1.20
1989	LT 4	LT 4	LT 4	LT 4	LT 4	LT 4

NST = No Sample Taken
LT = Less Than
ND = Non-Detectable
DNGRD = DOWNGRADIENT
UPGRD = UPGRADIENT

(See "History of Monitoring Wells" in Appendix C for a brief chronology of events concerning the existing wells, based on correspondence found in the Soil Mechanics Bureau files).

VI. CONCLUSIONS

Based on information obtained through the boring program, as well as from other sources (listed in Appendix E, Bibliography) the following conclusions have been made:

- Disposal sites B-212 and SA-13 are located on the Hudson River flood plain. They are underlain by lacustrine and recent alluvial deposits.

- The boring program confirmed the geologic history of soil deposition at each site.

- Both disposal sites are located on a relatively thick (30-40 feet) deposit of pervious granular soil, consisting of various combinations of sands, silts and gravels.

- A continuous confining soil layer exists 30-40 feet below each site. This impermeable clay layer dips to the south and towards the river at both sites.

- The groundwater surface at each site also slopes down toward the river and dips to the south.

- The existing monitoring wells are located in the upper layer of granular soil at each site. These are suitable to monitor floating contaminants.

- The existing monitoring wells are located upgradient and downgradient of each site.

- The separation of the upgradient wells from the mass of disposed, PCB-laden material may be insufficient to prevent contamination from the spoil areas.

- There may not be a sufficient number of downgradient wells at Site B-212 to accurately monitor PCB contamination from the disposal site, based on guidelines set forth in the EPA manual entitled "RCRA Ground-Water Monitoring Technical Enforcement Guidance Document".

- Because PCB's are "sinkers" (heavier than water), they will tend to descend through the groundwater, if the soil medium is of a porous nature, until their path is obstructed, such as by a less pervious confining layer. The PCBs will then concentrate at the surface of the confining layer, or migrate in the direction of ground water flow.

  The present wells at disposal sites SA-13 and B-212 (Well Nos. R-1 thru R-6) are located in the upper soil layers of sand, silt and gravel. The bottoms of these wells are substantially above the continuous confining layers of clayey silt and silty clay. Based on the above discussion, it is possible that water samples extracted from these wells do not represent the actual PCB concentration leaching from the spoil areas.

  To verify this, it will be necessary to install additional wells which extend to the top of the confining layers.

VII. RECOMMENDATIONS

As previously stated, deeper wells will be required in order to monitor PCB concentrations at the surface of the confining layers below both disposal sites SA-13 and B-212. Also, additional wells should be installed downgradient at Site B-212, to meet the requirements in "RCRA Ground-water Monitoring Technical Enforcement Guidance Document". All wells at Site B-212 should be of the cluster type, so groundwater can be monitored at the upper and lower confining layers.

A. WELL LOCATIONS AND ELEVATIONS

Presented below are this Bureau's recommended monitoring well locations and estimated screen elevations for each site:

Site	Station	Offset	Surface Elev.	*Estimated Screen Elevation (Bottom)	Screen Length (Feet)	Remarks
B-212	1+20	0	129.7	99	10'	Downgradient
B-212	1+20	0	129.7	88	10'	Cluster
B-212	7+00	120' Lt.	125.0	103	10'	Downgradient
B-212	7+00	120' Lt.	125.0	88	10'	Cluster
B-212	5+00	150' Rt.	125.0	104	10'	Upgradient
B-212	5+00	150' Rt.	125.0	88	10'	Cluster
SA-13	0+00	100' Rt.	122.0	90	10'	Downgradient
SA-13	5+60	100' Rt.	125.0	97	10'	Downgradient
SA-13	14+70	100' Rt.	121.0	97	10'	Downgradient
SA-13	7+30	300' Lt.	126.6	99	10'	Upgradient

*Actual elevations will be dependent upon soils encountered during drilling operations.

Note: The recommended well locations and depths are depicted on Drawings Nos. 1-SM-2320-A thru 1-SM-2320-F in Appendix A.

B. CONSTRUCTION OF WELLS

1. Drilling Method

We recommend that six-inch inside diameter casing (size designation SW) be driven, with a split spoon sampler continuously advancing the hole the last ten feet to obtain an accurate measurement of the soil stratigraphy. This is important in determining the exact elevations of the confining layer(s).

All drill rods and casings should be steamed-cleaned so contaminants cannot be introduced into the boreholes. The water supply should be obtained from a municipal source, and not the river, to preclude the possibility of using PCB contaminated water.

2. Well Casing and Well Screen

We recommend Threaded Flush Joint PVC with an inside diameter of two inches. Well screens should be 10 feet in length and be sand packed.

These wells can be constructed inside the six inch diameter drill casing. Figure 1 shows a typical cross section of a monitoring well.

3. General

During construction of these wells, it is important that very careful measurements be taken while advancing the boreholes, and that the samples be examined closely to accurately determine the elevation of the confining layer.

The well screens should be embedded six inches to one foot into the confining layer. This will be critical at Site B-212 when installing wells in the upper confining layer, which is very thin at one location.

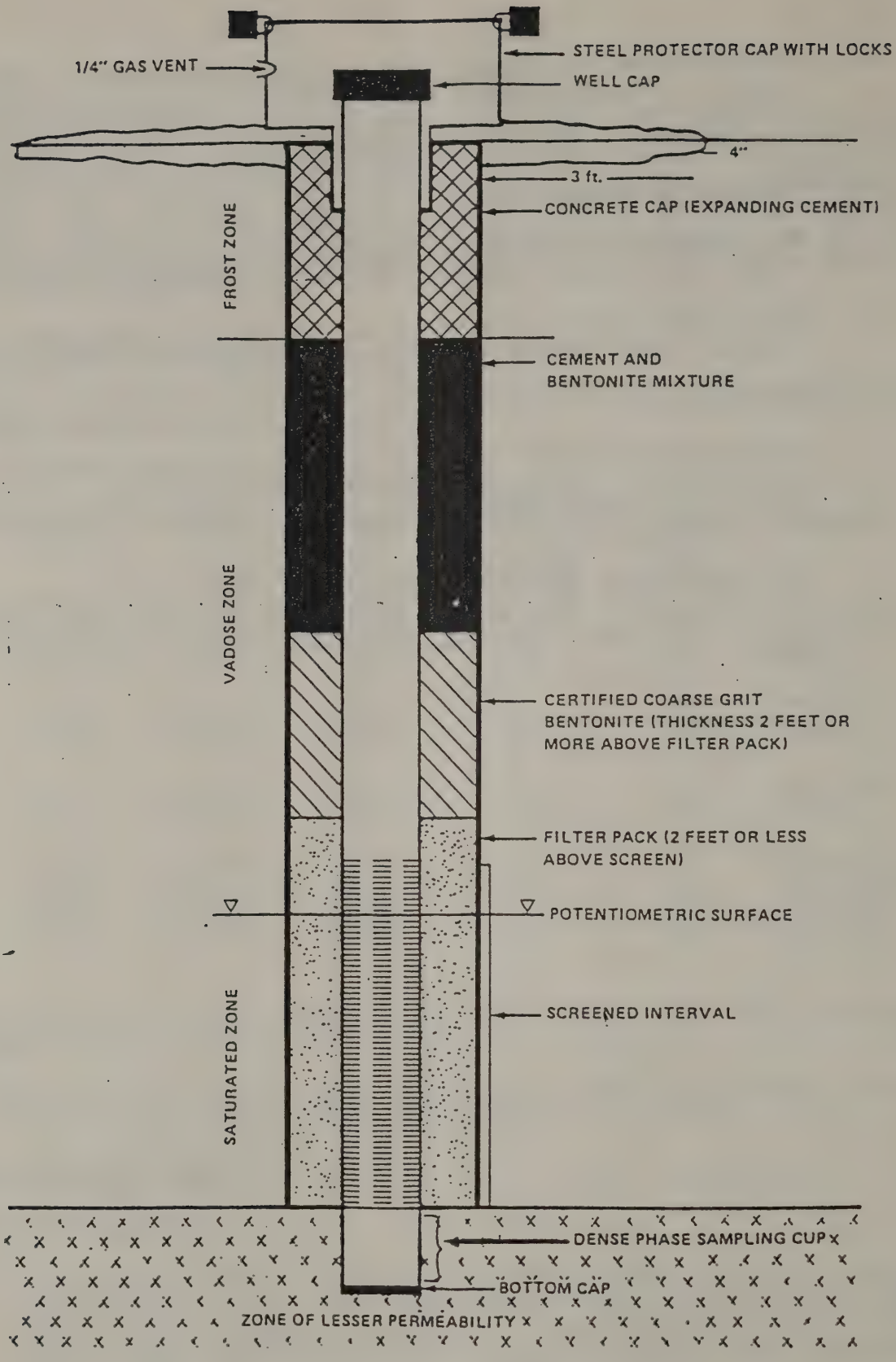
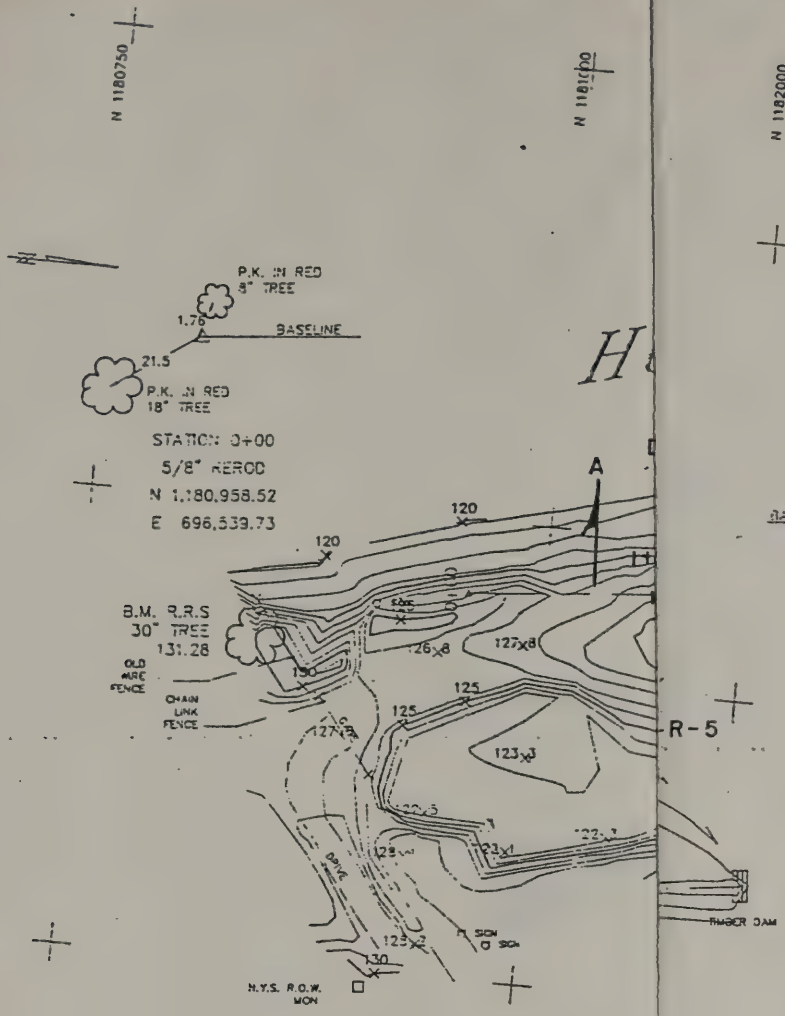


FIGURE 1 – GENERAL MONITORING WELL – CROSS SECTION

APPENDIX A

SITE PLANS AND SOIL PROFILES



LEGEND

- B-16 135.0 — *BORING W/ GROUND ELEVATION*
- Pz. #3 121.7 GPD 123.96 TOP CAP — *PIEZOMETER W/ TOP CASING & GROUND ELEVATION*
- WELL 121.9 GPD 124.62 TOP CAP — *WELL W/ TOP CASING & GROUND ELEVATION*
- SIGN — *NO TRESPASSING SIGN*
- 1990 SOIL BORING
- PROP. WELL LOCATION

...was established ... traverse using ...S.L.S) NAD 1927

Elevation 126.4' corresponds to the 100-yr floodwater elevation for this reach of the Hudson River (MPI, 1975).

...ablished by a ...g U.S.C.& G.S. ...elevation

Revised 7/26/90 revised contours/B-6 by:bm
Revised 7/10/90 added B-1,add'l. spot elev. by:bm

...was established ...00 hrs. & 1600 hrs.

NOTE : THIS DRAWING IS BASED ON MALCOLM - PIRN... SITE PLAN OF THIS AREA, DATED JANUARY...

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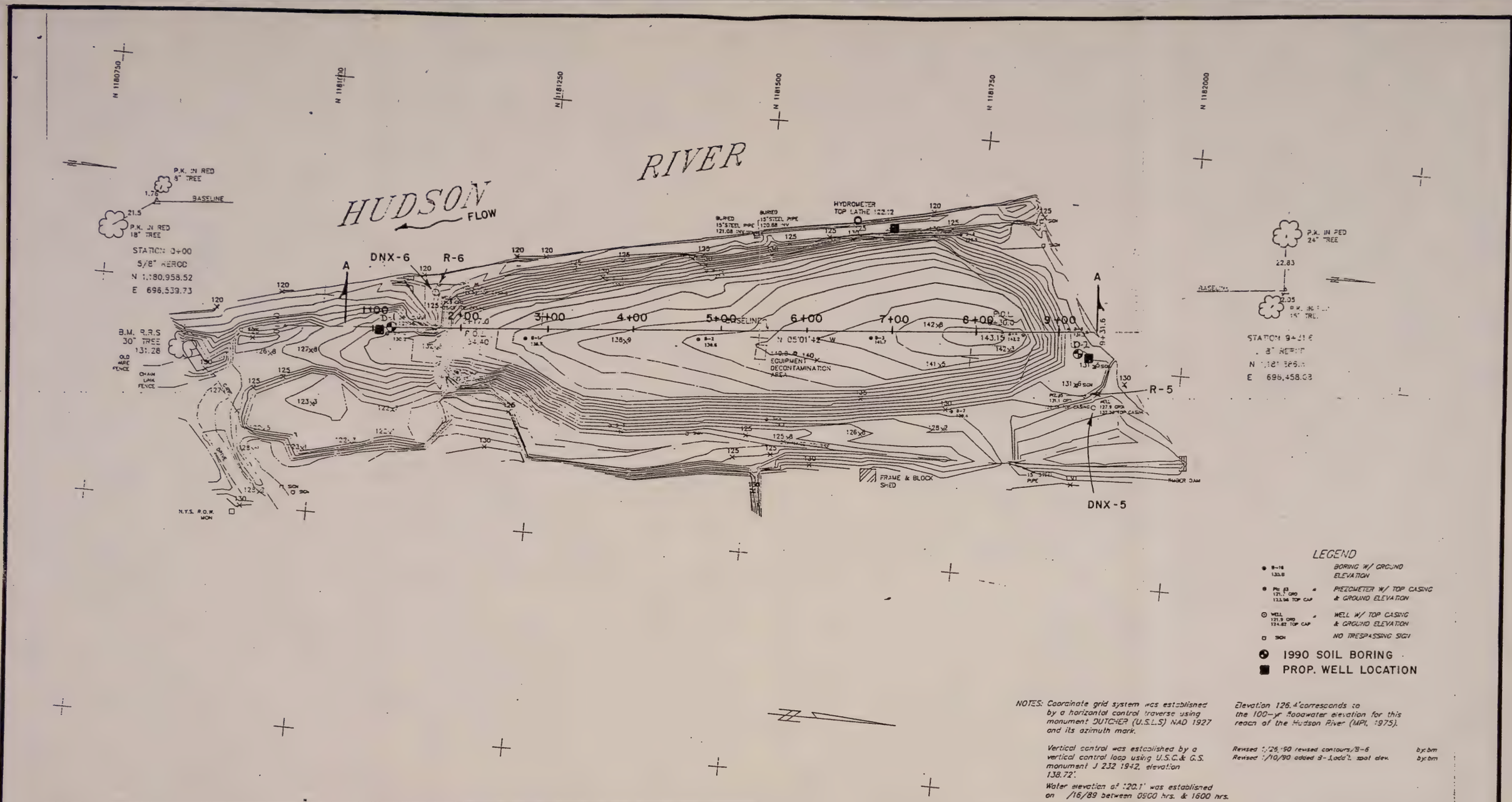
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

SITE PLAN
DREDGE DISPOSAL SITE
BOUY - 212

SCALE : 1" = 100'

Page A-1

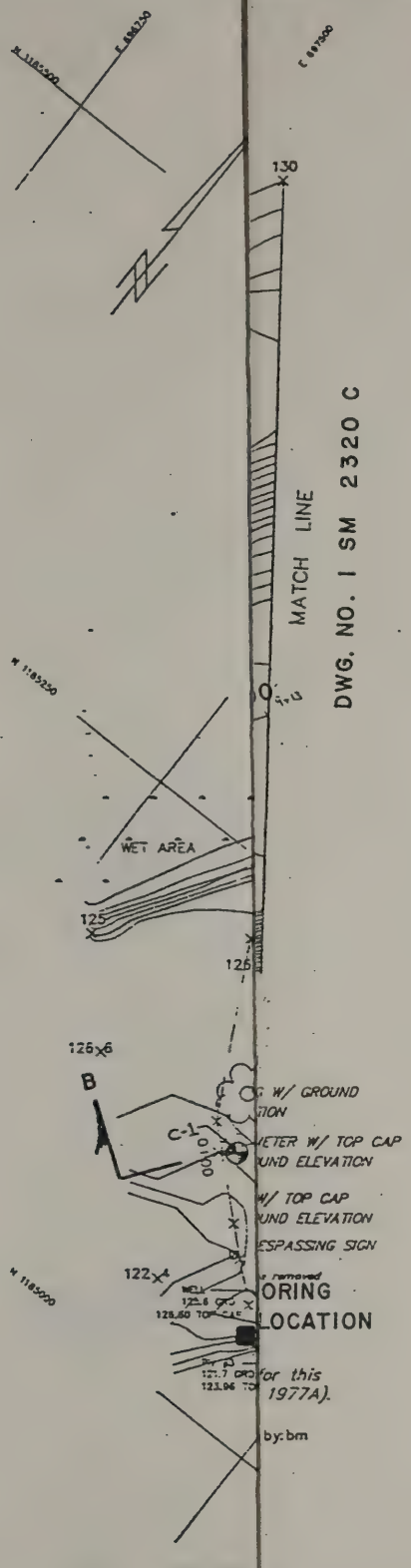
DRAWING 1 OF 6



NOTE : THIS DRAWING IS BASED ON MALCOLM - PIRNIE, INC. SITE PLAN OF THIS AREA, DATED JANUARY 1989.

Prepared By: J. Curtis Drawn By: E Gordon Dwg. Reviewed By: H. Page Checked By SE Sweeney	APPROVED 1990 W.P. Moody SEC DIRECTOR SOIL MECHANICS BUREAU REGION NO. 1 COUNTY: WASHINGTON DWG. NO. 1 SM 2320A	STATE OF NEW YORK DEPARTMENT OF TRANSPORTATION TECHNICAL SERVICES DIVISION SITE PLAN DREDGE DISPOSAL SITE BOUY - 212 SCALE: 1" = 100' DRAWING 1 OF 6

Page A-1



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DEPARTMENT OF TRANSPORTATION
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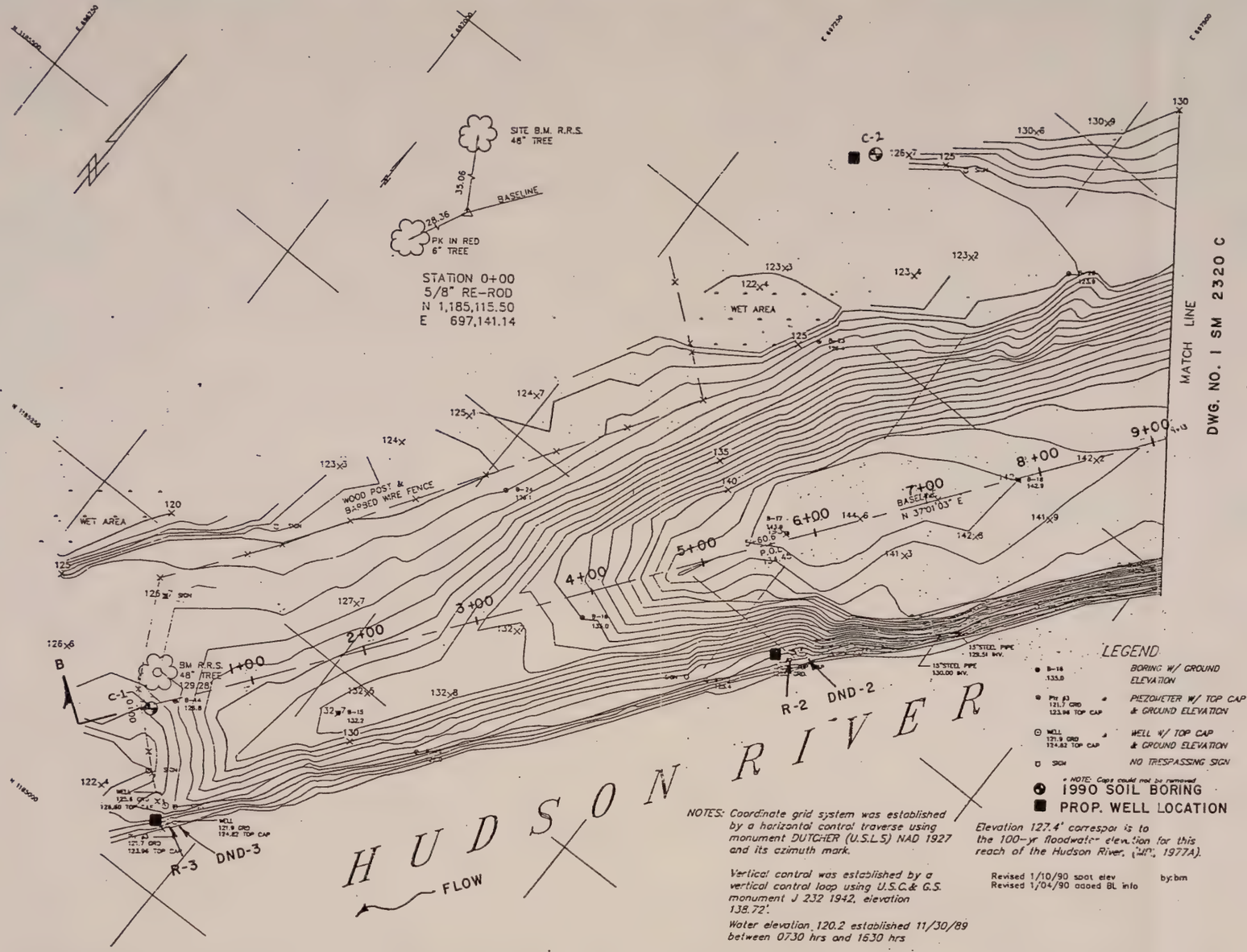
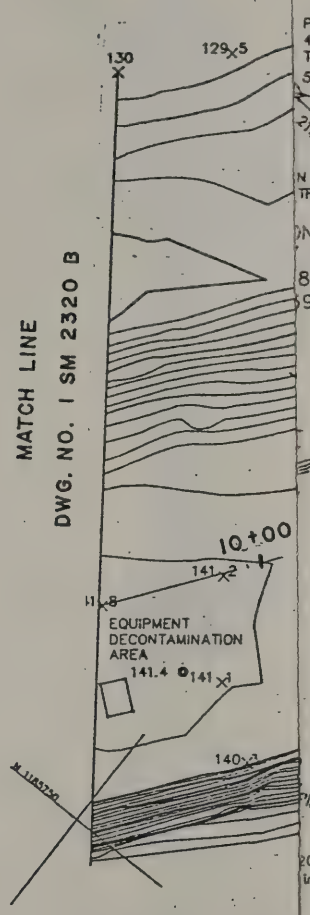
SITE PLAN
DREDGE DISPOSAL SITE
SPECIAL AREA 13 Page A-2
SCALE : 1"=100' DRAWING 2 OF 6



NOTE : THIS DRAWING IS BASED ON MALCOLM - PIRNIE, INC. SITE PLAN OF THIS AREA, DATED JANUARY 1989.

Prepared By: J. Curtis Drawn By: E Gordon Dwg. Reviewed By: D. Pagl Checked By: S E Swenny	APPROVED 1990 W P Moody DIRECTOR SOIL MECHANICS BUREAU REGION NO. 1 COUNTY: SARATOGA DWG. NO. 1 SM 2320 B	STATE OF NEW YORK DEPARTMENT OF TRANSPORTATION TECHNICAL SERVICES DIVISION SITE PLAN DREDGE DISPOSAL SITE SPECIAL AREA 13 SCALE : 1"=100' DRAWING 2 OF 6



NOTE: THIS DRAWING IS BA
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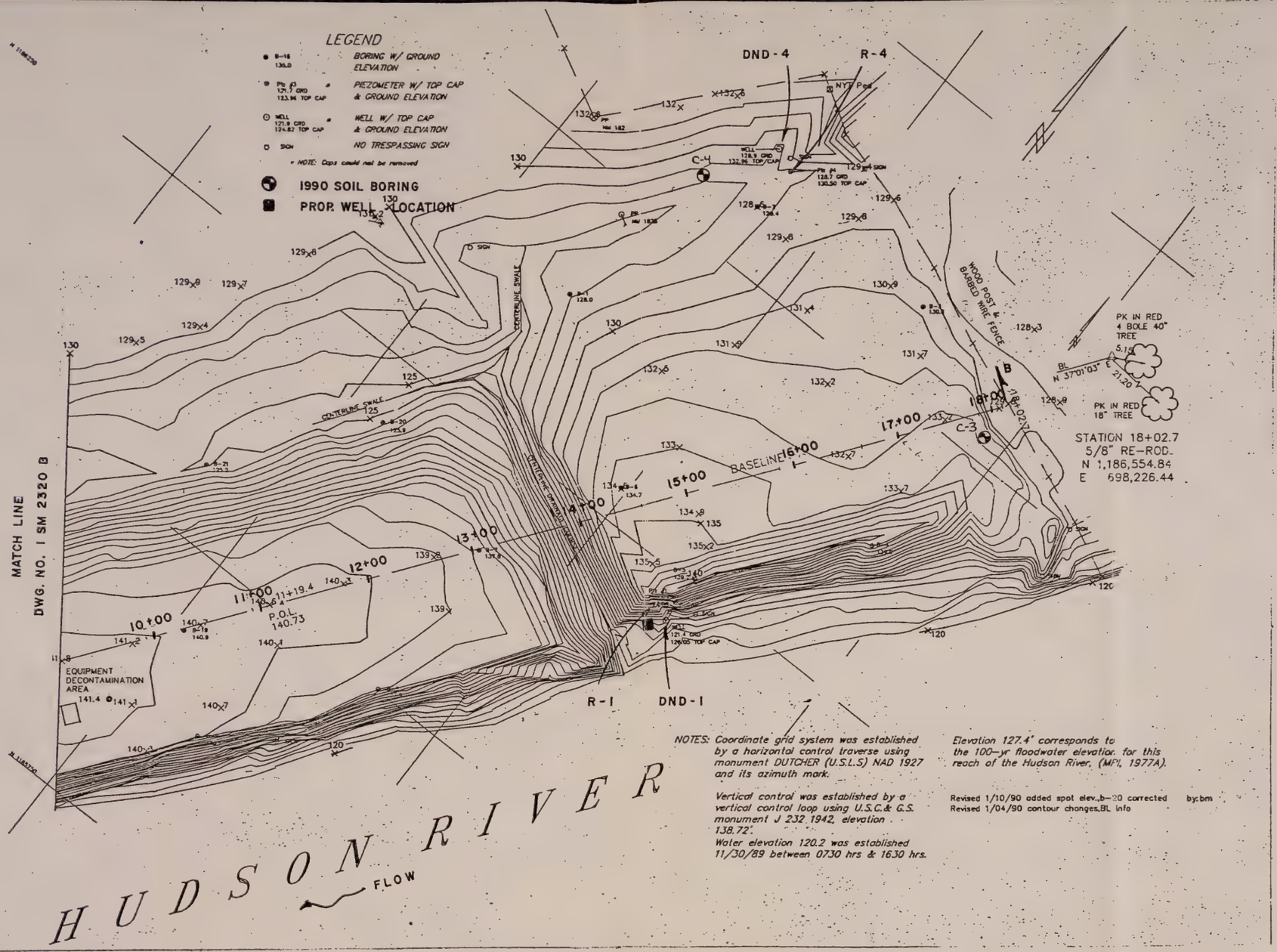
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

SITE PLAN
DREDGE DISPOSAL SITE
SPECIAL AREA 13
SCALE: 1"= 100'



NOTES: Coordinate grid system was established by a horizontal control traverse using monument DUTCHER (U.S.L.S) NAD 1927 and its azimuth mark.

Vertical control was established by a vertical control loop using U.S.C.& G.S. monument J 232 1942, elevation 138.72'.

Water elevation 120.2 was established 11/30/89 between 0730 hrs & 1630 hrs.

Elevation 127.4' corresponds to the 100-yr floodwater elevation for this reach of the Hudson River, (MPI, 1977A).

Revised 1/10/90 added spot elev.,b-20 corrected by:bm
Revised 1/04/90 contour changes,BL info

NOTE: THIS DRAWING IS BASED ON MALCOLM - PIRNIE, INC. SITE PLAN OF THIS AREA , DATED JANUARY 1989 .

Prepared By: J. CURTIS
Drawn By: E Greenan
Dwg. Reviewed By: D Pagl
Checked By: SE Sweeney

APPROVED 1990
W P Dunsdon P.E.
DIRECTOR
SOIL MECHANICS BUREAU

REGION NO. 1
COUNTY: SARATOGA
DWG. NO. 1 SM 2320 C

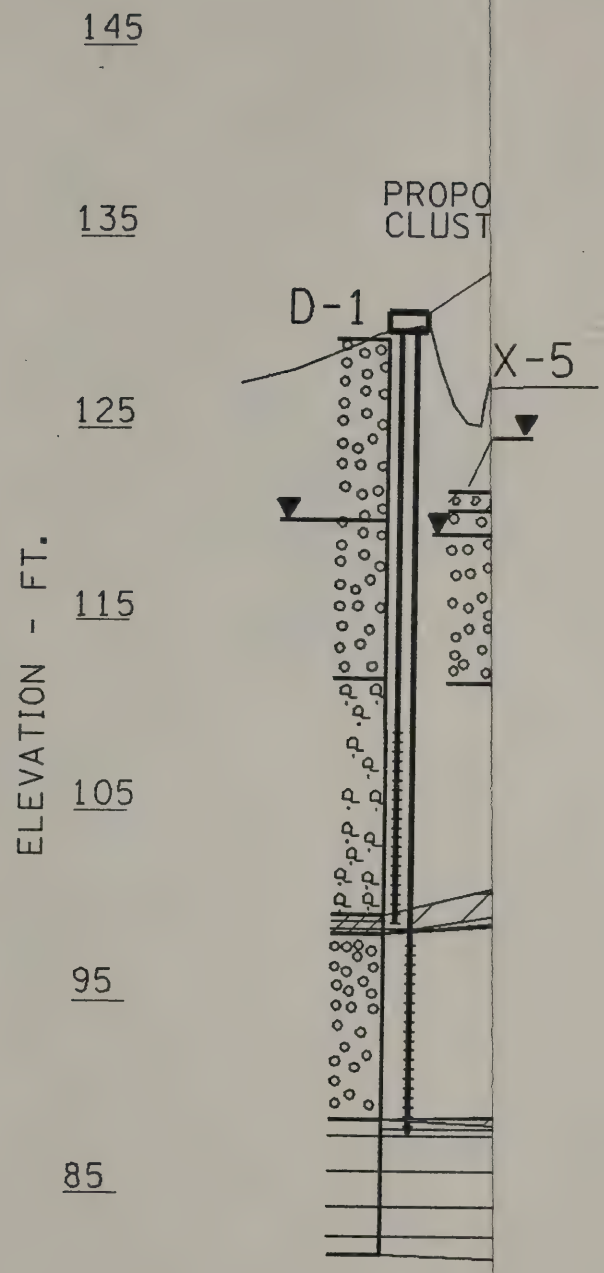
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

SITE PLAN
DREDGE DISPOSAL SITE
SPECIAL AREA 13
SCALE: 1"= 100'

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

HUDSON RIVER DREDGE DISPOSAL SITE
BOUY 212

CAPITAL PROJECT IDENTIFICATION NO. 1940.35



NOTE: SOIL SYMBO
ON DRAWING NO.1S

19 90

ECTOR
ANICS BUREAU

SHINGTON

SM 2320 D

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

BOUY 212
GENERAL SUBSURFACE PROFILE

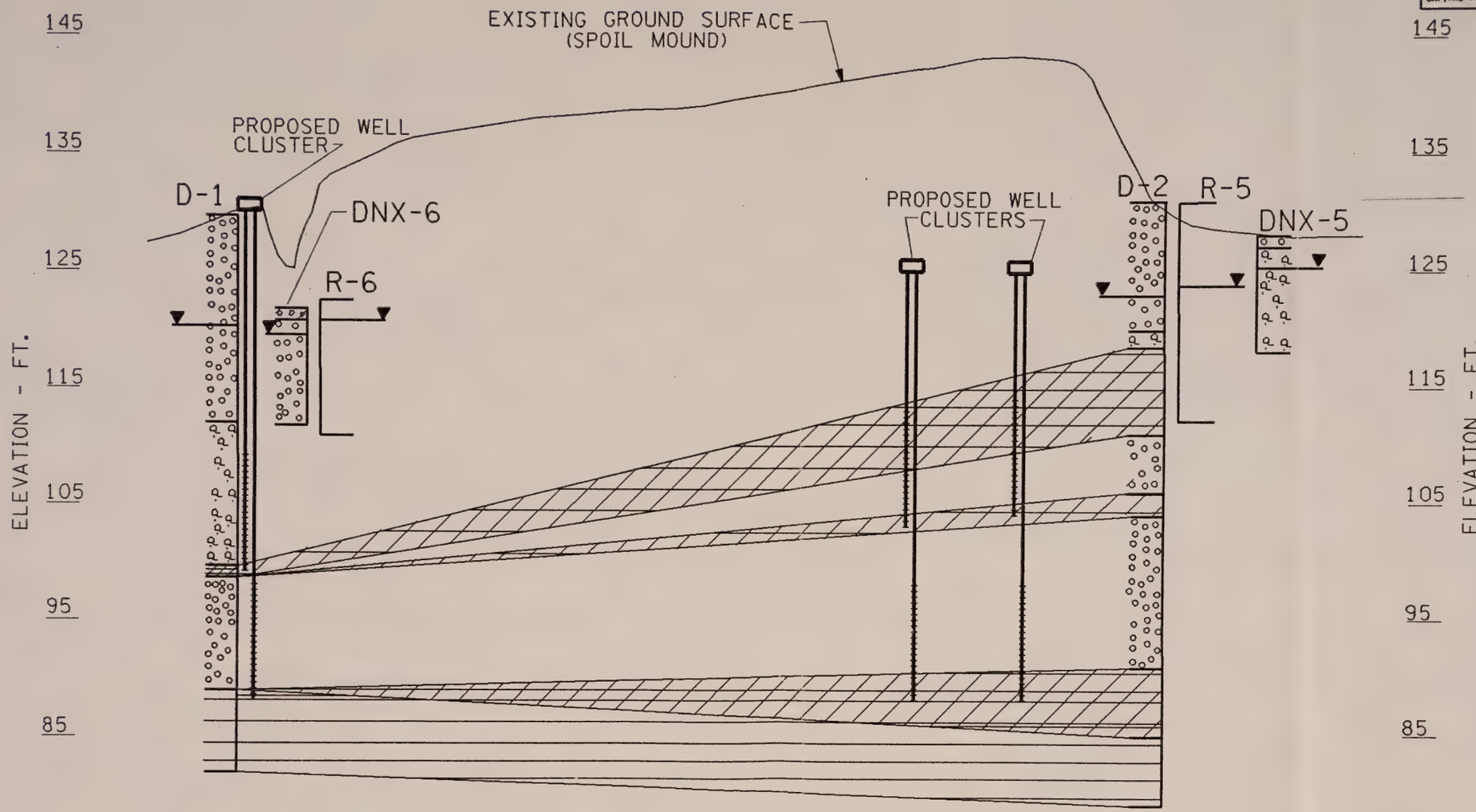
Page A-4

DRAWING NO. 4 OF 5

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

HUDSON RIVER DREDGE DISPOSAL SITE
BOUY 212

CAPITAL PROJECT IDENTIFICATION NO. 1940.35



NOTE: SOIL SYMBOL KEY IS LOCATED ON DRAWING NO.1SM2320 F

SECTION A - A

SCALE: HORIZONTAL 1"=100'
VERTICAL 1"=10'

Prepared by: J CURTIS
Drawn by: DJJ
Reviewed by: MEL
Checked by: SESWEET

APPROVED 19 90
W P Mundy SES
DIRECTOR
SOIL MECHANICS BUREAU

REGION NO. 1
COUNTY WASHINGTON
DWG. NO. 1 SM 2320 D

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

BOUY 212
GENERAL SUBSURFACE PROFILE

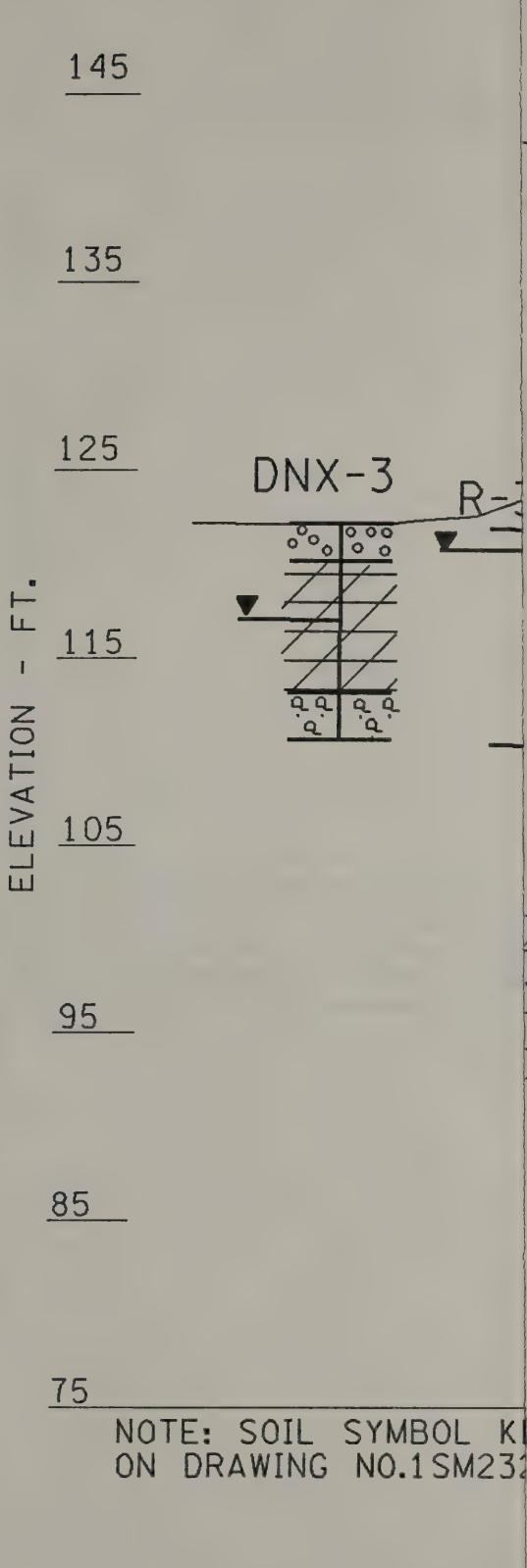
Page A-4

DRAWING NO. 4 OF 6

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

HUDSON RIVER DREDGE DISPOSAL SITE
SPECIAL AREA 13

CAPITAL PROJECT IDENTIFICATION NO. 1940.35



NOTE: SOIL SYMBOL KI
ON DRAWING NO.1SM232

1990

ECTOR
ANICS BUREAU

1

ARATOGA

SM 2320 E

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

SPECIAL AREA 13
GENERAL SUBSURFACE PROFILE

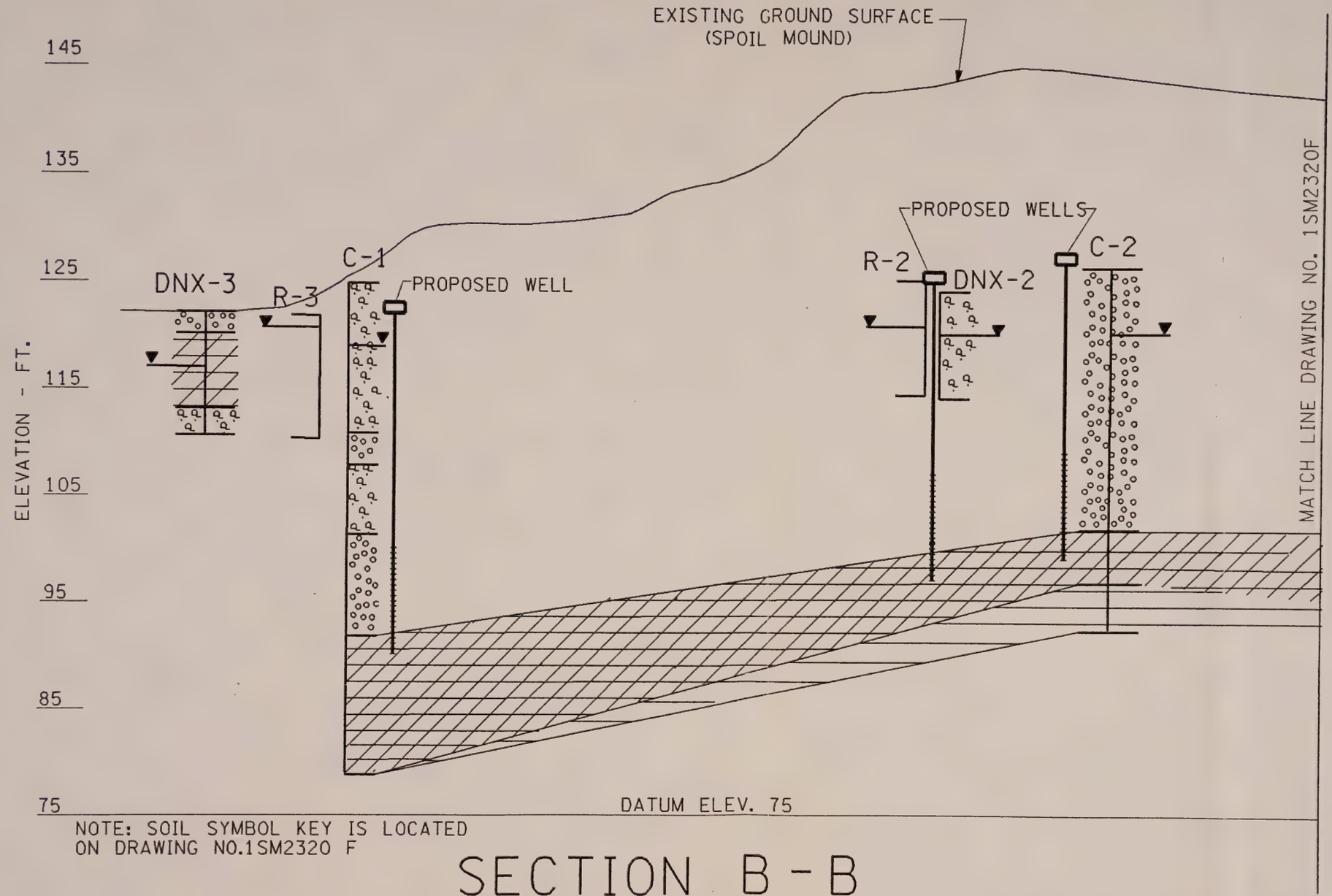
Page A-5

DRAWING NO. 5 OF 6

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

HUDSON RIVER DREDGE DISPOSAL SITE
SPECIAL AREA 13

CAPITAL PROJECT IDENTIFICATION NO. 1940.35



NOTE: SOIL SYMBOL KEY IS LOCATED ON DRAWING NO.1SM2320 F

SECTION B-B

SCALE: HORIZONTAL 1"=100'
VERTICAL 1"=10'

Prepared by: J. CURTIS
Drawn by: DWJ
Reviewed by: MEL
Checked by: SE Sweeney

APPROVED 1990
WP Moseley SES
DIRECTOR
SOIL MECHANICS BUREAU

REGION NO. 1
COUNTY SARATOGA
DWG. NO. 1 SM 2320 E

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

SPECIAL AREA 13
GENERAL SUBSURFACE PROFILE

Page A-5

DRAWING NO. 5 OF 6

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

HUDSON RIVER DREDGE DISPOSAL SITE
SPECIAL AREA 13

CAPITAL PROJECT IDENTIFICATION NO. 1940.35

MATCH LINE DRAWING NO. 1SM2320E

SYMBOLS

OLE DNX,D,C,R

D WATER LEVEL

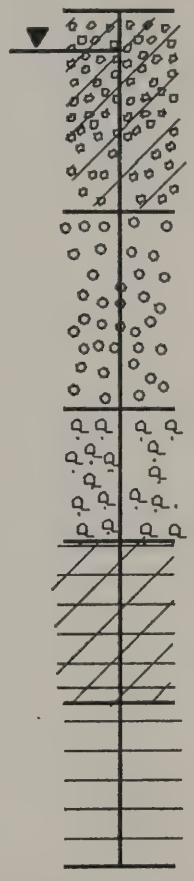
ose to Loose Dark
Organic Sandy SILT
y SAND

ose to Medium
Brown & Black
SILT and Silty
ND

ose to Medium
Gray, Brown and
ravelly SAND to Silty
ravelly

d Very Soft to Soft
Gray/Brown Silty
layey SILT and Fine
SILT

oft to Firm Gray &
own Clayey SILT
y CLAY



1816
1385
-431

1990

ECTOR
ANICS BUREAU

1

ARATOGA

SM 2320 F

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

SPECIAL AREA 13

GENERAL SUBSURFACE PROFILE

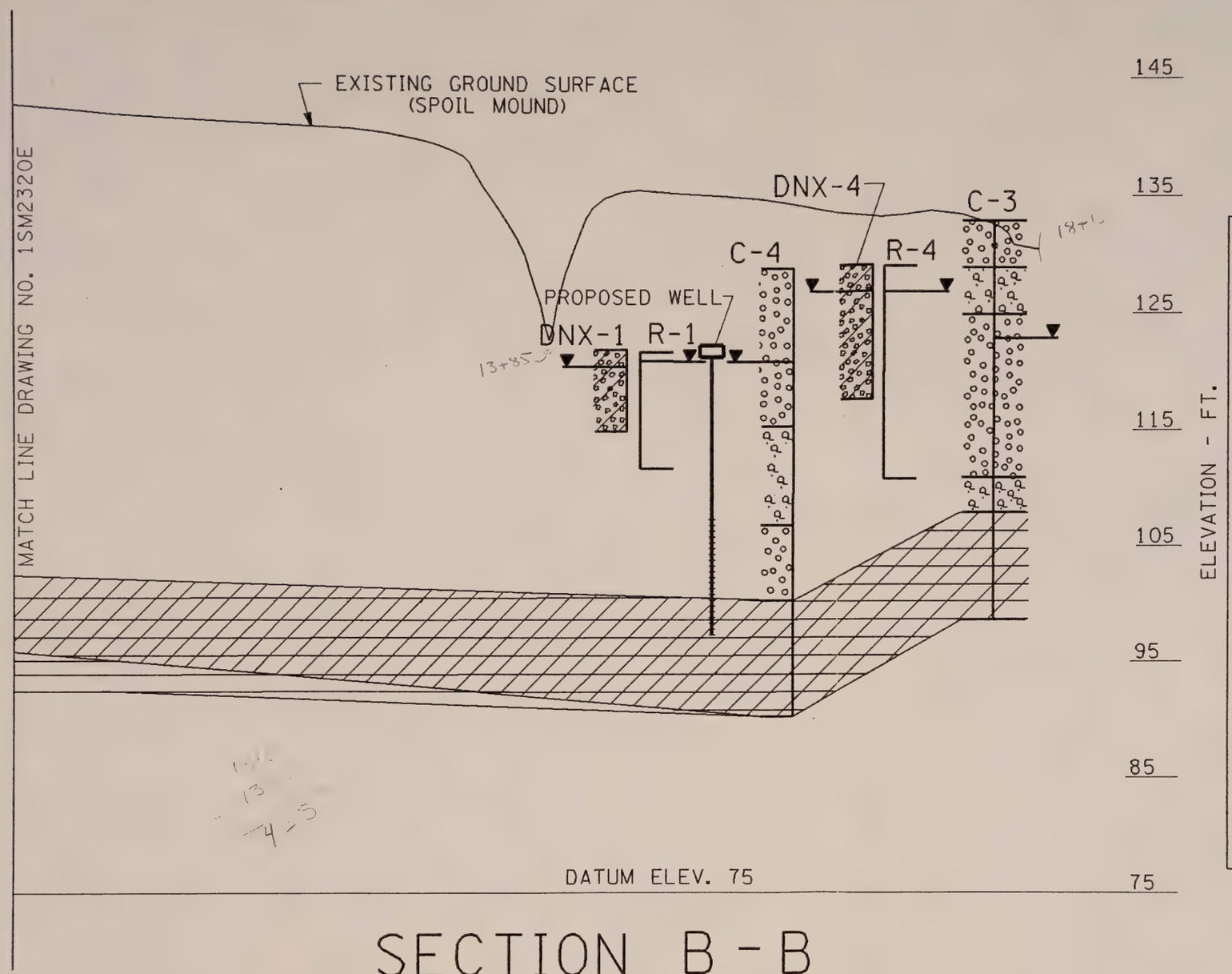
Page A-6

DRAWING NO. 6 OF 6

FED. RD. REG. NO.	STATE	FEDERAL AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
	NEW YORK			

HUDSON RIVER DREDGE DISPOSAL SITE
SPECIAL AREA 13

CAPITAL PROJECT IDENTIFICATION NO. 1940.35



SECTION B-B

SCALE: HORIZONTAL 1"=100'
VERTICAL 1"=10'

SYMBOLS

DRILL HOLE — DNX,D,C,R

OBSERVED WATER LEVEL

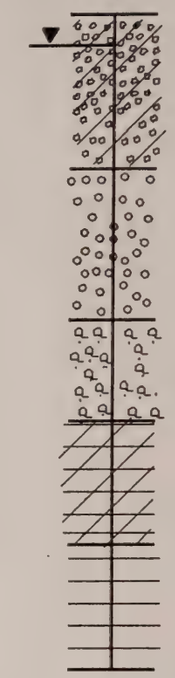
Very Loose to Loose Dark Brown Organic Sandy SILT and Silty SAND

Very Loose to Medium Compact Brown & Black Sandy SILT and Silty Fine SAND

Very Loose to Medium Compact Gray, Brown and Black Gravelly SAND to Silty SAND, Gravelly

Layered Very Soft to Soft Gray & Gray/Brown Silty CLAY, Clayey SILT and Fine Sandy SILT

Very Soft to Firm Gray & Gray/Brown Clayey SILT and Silty CLAY



Prepared by: J. Curtis	APPROVED 1990
Drawn by: D.J.J.	W P Moody Jr.
Reviewed by: MEL	DIRECTOR SOIL MECHANICS BUREAU
Checked by: S.E. Swanger	REGION NO. 1
	COUNTY SARATOGA
	DWG. NO. 1 SM 2320 F

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
TECHNICAL SERVICES DIVISION

SPECIAL AREA 13
GENERAL SUBSURFACE PROFILE
Page A-6

DRAWING NO. 6 OF 6

APPENDIX B

SUBSURFACE EXPLORATION LOGS

NOTE: SUBSURFACE EXPLORATION LOGS FOR HOLES NOS. DNX-1 THROUGH DNX-6 HAVE STATION, OFFSET AND SURFACE ELEVATIONS BASED ON DEPARTMENT OF TRANSPORTATION SURVEY DATA FROM 1979. INFORMATION IN THIS REPORT, CONCERNING LOCATIONS AND ELEVATIONS OF THESE BORINGS, IS BASED ON MALCOLM-PIRNIE SURVEY INFORMATION FROM 1989.

SM 282e (2/70)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG

REGION 1 | COUNTY Saratoga | PIN 1940.35.101 | PROJECT Hudson River Dredge Disposal Sites - Special Area #13
SOIL SERIES - | COORD. LOC. - | DATE START 4/9/90 | DATE FINISH 4/10/90
HOLE C-1 | LINE M-P BL | STA 0+10 | OFFSET 0 | SURF. ELEV. 125.05 | DEPTH TO WATER 6' ±

--Hollow Stem Flight Auger
CASING O.D. - I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
25		13			7			
		continued				8		
26		14	5				Gray fine SAND Recovery 20" (W-NPL)	
27				7				
					8			
28		15	2			9	Gray fine SAND w/2" layer of coarse SAND Recovery 18" (W-NPL)	
29				3			changing to	
					5		Gray Silty fine SAND	
30		16	2			6	Gray Silty fine SAND Recovery 20" (W-NPL)	
31				5				
					4			
32		17	1			2	Gray Silty fine SAND (W-NPL)	
33				1			changing to	
					2		Gray Clayey SILT (W-LPL)	
34		18	1			1	Gray fine SAND (maybe wash) (12") (W-NPL)	
35				3				
					2		Gray Clayey SILT Recovery 24" (W-LPL)	
36			wor			2	No Recovery	
37				1				
					1			
38		19	wor			1	Gray Silty CLAY with two 1" layers of fine Sandy SILT (W-PL)	
39				wor			Recovery 24" (W-NPL)	
					2			
40		20	wor			1	Layered 6"-8" Gray Silty CLAY and Recovery 24" (W-PL)	
41				wor			1/2"-1" Gray fine Sandy SILT (W-NPL)	
					1			
42		21	wor			1		
43				wor			Ditto Recovery 24" (W-PL)	
					2		(W-NPL)	
44		22	wor			1	Layered 4"-6" Gray Silty CLAY Recovery 24" (W-PL)	
45				1			1/2"-1" Gray SILT (W-NPL)	
					1			
46						1		
							END OF HOLE - 46'	

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bob Jablonski & Pat Norton
SOIL & ROCK DESCRIP. MPI Tony Murtagh
REGIONAL SOILS ENGR. DOT Walt Jutkofsky
SHEET 2 OF 2
STRUCTURE NAME/NO. Special Area #13

HOLE C-1

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Saratoga
PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Special Area #13
SOIL SERIES -
COORD. LOC. -
DATE START 4/9/90 DATE FINISH 4/10/90

HOLE C-1
LINE M-P BL
STA 0+10
OFFSET 0
SURF. ELEV. 125.05
DEPTH TO WATER 6' ±

--Hollow Stem Flight Auger
CASING O.D. - I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0		1	1	3	2	3	Brown/Black Silty fine SAND with gravel (M-NPL)	
1							& grass roots Recovery 18"	
2		2	4	3	3		Brown Silty fine SAND, Gravelly (M-NPL)	
3						3	changing to Recovery 15"	
4		3	3	3	2	2	Black/Brown Gravelly fine SAND with wood pcs.	
5							Black/Brown Gravelly medium SAND Recovery 12" (M/W-NPL)	
6		4	3	4	4	2	Brown Gravelly medium SAND changing to 12" (W-NPL)	
7							Black Silty fine SAND w/gravel pcs 12"	
8		5	3	4	4	2	Black Silty SAND with gravel pcs & wood chips (W-NPL)	
9							Recovery 12"	
10		6	2	2	3	4	Black Silty SAND with gravel pcs &wood pieces (W-NPL)	
11							Recovery 13"	
12		7	8	11	8	10	Gray/Black Silty SAND with gravel pcs & occasional wood pcs	
13							Recovery 12" (W-NPL)	
14		8	8	5	4	7	Gray/Black Silty SAND Recovery 8" (W-NPL)	
15								
16		9	6	7	7	7	Gray/Black Silty SAND (W-NPL)	
17							changing to	
18		10	3	5	5	11	Gray/Black Gravelly medium SAND (5' Sand run in)	
19							Gray/Black Silty SAND, Gravelly Recovery 24" (W-NPL)	
20		11	2	4	6	8	Gray/Black fine Gravelly coarse SAND (W-NPL)	
21								
22		12	9	8	5	8	Gray/Black coarse SAND Recovery 24" (W-NPL)	
23							changing to	
24		13	3	6			Gray/Black fine SAND Gray fine SAND Recovery 18" (W-NPL)	
25								

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bob Jablonski & Pat Norton
SOIL & ROCK DESCRIP. MPI Tony Murtagh
REGIONAL SOILS ENGR. DOT Walt Jutkofsky
SHEET 1 OF 2
STRUCTURE NAME/NO. Special Area #13

HOLE C-1

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1 | COUNTY Saratoga | PIN 1940.35.101 | PROJECT Hudson River Dredge Disposal Sites - Special Area #13
SOIL SERIES | COORD. LOC. | DATE START 4/10/90 | DATE FINISH 4/16/90
Hollow Stem Flight Auger

HOLE C-2 | LINE M-P BL | STA 7+30 | OFFSET 298' Lt. | SURF. ELEV. 126.6' | DEPTH TO WATER NA

CASING O.D. - I.D. 3-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0		1	1				4" Light Brown Silty fine SAND (M-NPL)	
1				1			4" Brown fine Sandy SILT	
2					2			
						3		
		2	1				Poor recovery grass; plugged basket	
3				1				
4					2			
						1		
		3	WOR				No recovery	
5				1				
6					1			
						1		
		4	1				3" Dark Brown fine Sandy SILT (W-NPL)	
7				1			15" Light Brown fine SAND	
					1			
8						1		
		5	1				Mottled Light Brown/Gray Silty fine SAND (W-NPL)	
9				1				
					2			
10						2		
		6	1				8" Mottled Brown/Gray Silty fine SAND (W-NPL)	
11				3			8" Mottled Light Brown/Dark Brown Silty coarse SAND	
					3			
12	Hollow Stem Auger					5		
		7	3				10" Mottled Light Brown/Brown Silty coarse SAND (W-NPL)	
13				4			6" Black fine Gravelly SAND	
					3			
14						2		
		8	4				8" Light Brown Silty SAND (W-NPL)	
15				2			8" Black Silty SAND, occasional Gravel pcs	
					3			
16						7		
		9	5				12" Black Silty medium SAND (W-NPL)	
17				8			8" Brown Silty medium SAND	
					11			
18						10		
		10	7				4" Brown Silty medium SAND (W-NPL)	
19				6			16" Black Silty fine SAND w/1" layer Gravelly SAND	
					8			
20						9		
		11	3				Brown/Black Silty medium SAND (W-NPL)	
21				4				
					6			
22						6		
		12	5				Gray/Black Silty fine SAND (W-NPL)	
23				8				
					9			
24						5		
		13	4				4" Brown fine SAND w/wood pc. changing to (W-NPL)	
25				5			14" Layered Silty CLAY Silty fine SAND	

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bob Jablonski/Pat Norton
SOIL & ROCK DESCRIP. DOT-Walt Jutkofsky
REGIONAL SOILS ENGR. DOT-Jim Curtis
SHEET 1 OF 2
STRUCTURE NAME/NO. Special Area 13

HOLE C-2

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Saratoga
PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Special Area #13
SOIL SERIES -
COORD. LOC. -
DATE START 4/10/90 DATE FINISH 4/16/90
Hollow Stem Auger

HOLE C-2
LINE M-P BL
STA 7+30
OFFSET 298' Lt.
SURF. ELEV. 126.6'
DEPTH TO WATER NA

CASING O.D. - I.D. 3-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
25					8		Sample 13 continued from previous page	
						7	End 4/10/90	
26		14	12				14" Brown medium to coarse SAND Start 4/16/90 (W-NPL)	
				5			6" Gray Clayey SILT (W-PL)	
27					2			
						3		
28		15	7				22" Gray Silty fine SAND (W-NPL)	
				5				
29					4			
						5	2" Gray Silty CLAY	
30		16	1					
				1				
31					2		24" Gray Silty CLAY (W-PL)	
						1		
32		17	WH					
				1			24" Gray Silty CLAY (W-PL)	
33					1			
						1	End 4/16/90	
34								
35	Hollow Stem Auger						END OF HOLE @ 34.0'	

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bob Jablonski/Pat Norton
SOIL & ROCK DESCRIP. D. Page (4/16/90)
REGIONAL SOILS ENGR.
SHEET 2 OF 2
STRUCTURE NAME/NO. Special Area 13

HOLE C-2

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1 | COUNTY Saratoga | PIN 1940.35.101 | PROJECT Hudson River Dredge Disposal Sites - Special Area #13 | SOIL SERIES - | COORD. LOC. - | DATE START 4/11/90 | DATE FINISH 4/11/90

HOLE C-3 | LINE M-P BL | STA 17+77 | OFFSET 22' Rt. | SURF. ELEV. 132.6' | DEPTH TO WATER 10'±

Hollow Stem Flight Auger

CASING O.D. - I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -

SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0		1	2				Tan fine SAND Recovery 10" (M-NPL)	
1				2				
					3		Gray medium SAND	
2						4		
		2	8				Gray medium SAND Recovery 15" (M-NPL)	
3				9				
					7			
4						9		
		3	7				Light Brown medium SAND with occasional Gravel (M-NPL)	
5				7			pcs. Recovery 12"	
					6			
6						7		
		4	4				Ditto Recovery 12" (M-NPL)	
7				4				
					6			
8						6		
		5	9				Brown/Gray Silty fine SAND w/few pcs wood (M-NPL)	
9				5			Recovery 12"	
					4			
10						4		
		6	3				Light Brown Silty fine SAND Recovery 12" (W-NPL)	
11				2				
					2			
12						2		
		7	1				Brown Silty fine SAND Recovery 12" (W-NPL)	
13				2				
					2			
14						4		
		8	4				Brown Silty fine SAND Recovery 15" (W-NPL)	
15				1				
					2			
16						3		
		9	1				Mottled Brown/Gray Silty fine SAND Recovery 15" (W-NPL)	
17				3				
					4			
18						7		
		10	9				Brown Silty fine SAND Recovery 4" (W-NPL)	
19				8				
					8		Poor recovery (4") No sample taken	
20						8		
		11	1				Brown Rusty Silty fine SAND Recovery 12" (W-NPL)	
21				4			changing to	
					3		Gray Silty fine SAND with layers of partially decomposed	
22						7	wood (1/4" to 1/2")	
		12	3				Brown Silty fine SAND, Recovery 20" (W-NPL)	
23				4			Black Gravelly SAND (2" layer)	
					10		Gray/Black/Red layers Silty fine SAND	
24						12		
		13	10				Black fine Gravelly SAND changing to Recovery 12" (W-NPL)	
25				6			Gray Silty CLAY at 25± (4" layer)	

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bill Bosworth/Ray Varriale

SOIL & ROCK DESCRIP. MPI-Tony Murtagh ~~DOT Walt Jutkofsky~~

REGIONAL SOILS ENGR.

SHEET 1 OF 2

STRUCTURE NAME/NO. Special Area 13

HOLE C-3

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Saratoga
PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Special Area #13
SOIL SERIES -
COORD. LOC. -
DATE START 4/11/90 DATE FINISH 4/11/90
Auger

HOLE C-3
LINE M-P BL
STA 17+77
OFFSET 22' Rt.
SURF. ELEV. 132.6'
DEPTH TO WATER 10'+

CASING O.D. - I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK		MOIST. CONT. %
25		13			8		Gray Silty CLAY	(M-PL)	
26	continued					5			
		14	5				Black fine Gravelly SAND (may be wash) changing to	(W-NPL)	
27				3			Gray/Red Brown layered Clayey SILT & Silty CLAY	(M-PL)	
					5		Recovery 20"		
28						5			
		15	3				Gray/Brown layered Silty CLAY & Clayey SILT	(W-PL)	
29				2			(Varved) Recovery 20"		
					1				
30						2			
		16	1				same-Recovery 20"	(W-PL)	
31				0					
					0				
32						0			
		17	1				same-recovery 20"	(W-PL)	
33				2					
					2				
34						2			
							END OF HOLE - 34'		
35									

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bill Bosworth/Ray Varriale
SOIL & ROCK DESCRIP. MPI-Tony Murtagh
REGIONAL SOILS ENGR. DOT-Walt Jutkofsky
SHEET 2 OF 2
STRUCTURE NAME/NO. Special Area 13

HOLE C-3

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1 | COUNTY Saratoga | PIN 1940.35.101 | PROJECT Hudson River Dredge Disposal Sites - Special Area #13
SOIL SERIES - | COORD. LOC. - | DATE START 4/11/90 | DATE FINISH 4/12/90
Hollow Stem Flight Auger

HOLE C-4 | LINE M-P BL | STA 15+87 | OFFSET 275' Lt.
SURF. ELEV. 128.6' | DEPTH TO WATER 8'+

CASING O.D. - I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0		1	3				Light Brown medium SAND Recovery 12" (M-NPL)	
1				2			Possible cap material	
					2			
2						3		
		2	3				Light Brown medium SAND changing to (M-NPL)	
3				2			Recovery 14"	
					4		Dark Brown/Brown Silty fine SAND w/org.	
4						4		
		3	2				Dark Brown fine Sandy SILT Recovery 6" (M-NPL)	
5				1				
					1			
6						1		
		4	2				Dark Brown fine Sandy SILT Recovery 20" (M-NPL)	
7				2			changing to	
					6			
8						7	Brown/Gray Silty fine SAND	
		5	2				Gray Silty fine SAND Recovery 12" (W-NPL)	
9				2				
					3			
10						4		
		6	3				Gray Silty fine SAND Recovery 15" (W-NPL)	
11	Hollow Stem Auger			3				
					3			
12						5		
		7	3				Gray Silty fine SAND w/occasional pcs of org. (W-NPL)	
13				5			Recovery 20"	
					6		changing to	
14						9	Brown Gravelly coarse SAND (3")	
		8	10				Brown/Gray Gravelly coarse SAND Recovery 18" (W-NPL)	
15				8				
					8			
16						7		
		9	1				Brown/Gray fine Gravelly coarse SAND (W-NPL)	
17				4			Recovery 12"	
					5			
18						7		
		10	1				Gray/Black fine Gravelly coarse SAND (W-NPL)	
19				1			Recovery 12"	
					3			
20						4		
		11	8				Black fine Gravelly coarse SAND Recovery 12" (W-NPL)	
21				6				
					5			
22						4	End 4/11	
		12	8				12" SAND Start 4/12	
23				8			1/2" SILT	
					10		3" SAND (W-NPL)	
24						10	8-1/2" Silty fine SAND	
		13	wor				Started using bentonite MUD	
25				wor			fine SAND w/occasional SILT inclusions (continued next sheet)	

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CONTRACTOR Empire Soils SM DEC Contract
MPI-Consultant Supervisor - Tony Murtagh

DRILL RIG OPERATOR Bill Bosworth
SOIL & ROCK DESCRIP. Jutkofsky/Sweeney/Curtis
REGIONAL SOILS ENGR.
SHEET 1 OF 2
STRUCTURE NAME/NO. Special Area 13

HOLE C-4

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1 | COUNTY Saratoga | PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Special Area #13
SOIL SERIES - | COORD. LOC. -
DATE START 4/11/90 | DATE FINISH 4/12/90
Hollow Stem Fligh Auger

HOLE C-4 | LINE MP BL | STA 15+87 | OFFSET 275' Lt.
SURF. ELEV. 128.6' | DEPTH TO WATER 8'+

CASING O.D. - I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
25					1		(sample 13 continued from previous sheet)	
26						3		
		13A					Solid soil core; coarse SAND over fine SAND. Note: Auger stuck,	
27							withdrew (sample left in sampler overnite & froze?) Rods &	
		14	10				4-5" WASH auger started @ 28'	
28				3			5" Black coarse Sandy Gravel, changing abruptly to	
					4		6" Gray Silty fine SAND w/ 1/4" Layer Gray Clayey SILT (W-NPL)	
29						19	(M-LPL)	
		15	6				6" Gray fine SAND	
30				3			14" of alternating 1" Layers Gray Silty CLAY & Gray (M-LPL)	
					1		fine SAND	
31						1		
		16	1				16" Gray fine SAND	
32				2			4" Layered Gray CLAY & Silty fine SAND (M-LPL)	
					2			
33						2		
		17	wor					
34				wor			Gray Silty CLAY w/ 1/2" Layers Gray Silty fine SAND (M-LPL)	
	Hollow Stem Auger				1		& fine Sandy Silt	
35						2		
			overdriven					
36		18	wor				6" Layered Gray Silty fine SAND & fine Sandy SILT	
				1			5" Gray Silty CLAY w/Thin Layers Silty fine SAND (M-LPL)	
37					2			
38						2		
39							Bottom of Hole @ 38.5'	
40								

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CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bill Bosworth
SOIL & ROCK DESCRIP. Jutkofsky/Sweeney/Curtis
REGIONAL SOILS ENGR.
SHEET 2 OF 2
STRUCTURE NAME/NO. Special Area 13

HOLE C-4

SM 282a (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG

REGION 1 | COUNTY Washington | PIN 1940.35.101 | PROJECT Hudson River Dredge Disposal Sites - Bouy 212 | SOIL SERIES - | COORD. LOC. - | DATE START 4/13/90 | DATE FINISH 4/16/90

HOLE D-1 | LINE M-P BL | STA 1 + 20 | OFFSET 0' | SURF. ELEV. 129.73' | DEPTH TO WATER 8.9'

CASING O.D. Auger I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOI CON %
0		(1)	1	2	-	3	6" Brown SAND 4" Dark Brown SAND w/Roots (M-NPL)	
1								
2		(2)	4	6	6	8	2" Dark Brown SAND (M-NPL) 10" Mottled Dark Brown & Black SAND w/Wood Chips (Possibly Dredge Material)	
3								
4		(3)	6	6	4	4	6" Brown SAND (May Have Fallen From Top) 8" Black SAND w/Wood Chips (M-NPL)	
5								
6		(4)	5	5	3	3	3" Brown SAND 6" Black SAND 3" Gray SILTY fine SAND w/ROOTS (M-NPL)	
7								
8		(5)	4	3	1	1	5" Brown SAND w/ROOTS (M-NPL) 3" Gray Silty fine SAND (M-W-NPL)	
9								
10		(6)	2	2	1	1	4" Green Silty fine SAND (W-NPL) 12" Brown Silty fine SAND w/pocs Green Silty fine SAND (W-NPL)	
11								
12		(7)	1	1	1	4	18" Mottled Gray & Black Silty Fine SAND (W-NPL)	
13								
14	Hollow Flight Auger	(8)	4	4	3	5	6" Mottled Gray, Green & Black Silty SAND 8" Layered Red/Brown & Gray SAND (W-NPL)	
15								
16		(9)	2	2	3	8	10" Mottled Gray & Red/Brown fine SAND (W-NPL) 12" Layered Dark Gray & Brown Silty SAND w/Seams of organic	
17								
18		(10)	wor	2	1	2	Gray SAND W/Occasional fine GRAVEL, w/thin layer Decomposed Shale @19.5' (W-NPL)	
19								
20		(11)	1	3	5	15	18" Gray Brown SAND w/2" Layer Coarse SAND Near Top (3" Down) 2" Gray Brown Coarse SAND 4" Black Decomposed Shale (Coarse SAND to fine Gravel) (W-NPL)	
21								
22		(12)	10	17	15	13	2" Ditto. 3" Gray/Brown Gravelly SAND 7" Mottled Brown & Red/Brown SAND (fine to Coarse) (W-NPL)	
23								
24		13	10	6			12" Black Silty SAND (Cont'd Next Sheet)	
25								

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CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bill Bosworth/Ray Varriale (Empire)
SOIL & ROCK DESCRIP. J. Curtis
REGIONAL SOILS ENGR.
SHEET 1 OF 2
STRUCTURE NAME/NO. Bouy 212

HOLE D-1

SM 282a (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Washington
PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Bouy 212
SOIL SERIES -
COORD. LOC. -
DATE START 4/13/90 DATE FINISH 4/16/90

HOLE D-1
LINE M-P BL
STA 1 + 20
OFFSET 0'
SURF. ELEV. 129.73'
DEPTH TO WATER 8.9'

CASING O.D. Auger I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIS CON %
25		13			8		Brown Silty SAND (W-NPL)	
26	continued					13		
		(14)	3				5" Ditto	
27				6			3" Black Coarse SANDY fine GRAVEL	
					9		7" Brown SAND to 3" Gray/Brown fine Sandy SILT to 6" Brown SAND	
28						19	(W-NPL)	
		(15)	11				7" Gray/Brown SAND	
29				7			2" Black fine Gravelly SAND (M-W-NPL)	
					8		6" Gray/Brown SAND	
30						6	6" Red/Brown SAND; 2" Plug Gray Clay @ bottom of sampler (M-PL)	
		(16)	11				10" Brown SAND (W-NPL)	
31				15			2" Varved SILT & CLAY (M-LPL)	
					16		12" Brown & Red/Brown Silty SAND (W-NPL)	
32						30		
		(17)	3					
33				6			18" Brown SAND	
					6		6" Gray Silty SAND (M-W-NPL)	
34						15	END 4/13	
		(18)	wor				START 4/16 @ 9:00 AM	
35				wor			24" Gray Silty fine SAND (W-NPL)	
					2			
36						2		
		(19)	2					
37				6				
					9			
38						17	24" DITTO	
		(20)	8				8" sluff	
39				12				
					72			
40							1.2' DITTO	
		(21)	wr					
41				wr			4" DITTO	
					1		6" LAYERED - GRAY Clayey SILT, Silty CLAY	
42						1	14" Gray CLAY	
		(22)	1					
43				3			12" Slough	
					3			
44						2	12" Gray CLAY	
		(23)	wr					
45				wr				
					1			
46						1	24" Gray CLAY	
		(24)	2					
47				2				
					3			
48						3	24" DITTO	
							END HOLE @ 48' @ 11:00 AM.	

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CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR Bill Bosworth/Ray Varriale (Empire)
SOIL & ROCK DESCRIP. J. Curtis
REGIONAL SOILS ENGR.
SHEET 2 OF 2
STRUCTURE NAME/NO. Bouy 212

HOLE D-1

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Washington
PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Bouy 212
SOIL SERIES -
COORD. LOC. -
DATE START 4/16/90 DATE FINISH 4/17/90

HOLE D-2
LINE M-P BL
STA 9+23
OFFSET 25' Rt.
SURF. ELEV. 131.04'
DEPTH TO WATER 8' ±

CASING O.D. Auger I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIS CONT %
0								
1		(1)	2	2			2" Brown SAND (M-NPL)	
					2		6" Gray/Brown fine Gravelly SAND (M-NPL)	
2		(2)	2			2		
				3			6" DITTO	
3					2		5" Brown fine Sandy SILT w/Organic (M-NPL)	
						4	5" Dark Brown DITTO	
4		(3)	4					
				2			8" DITTO	
5					3			
						5		
6		(4)	4					
				3			20" Brown and Dark Brown fine Sandy SILT (M-NPL)	
7					4			
						5		
8		(5)	5				2" Brown fine Sandy SILT	
				3			2" Brown Silty SAND	
9					7		1" Brown fine Sandy SILT	
						9	7" Brown Silty SAND (W-NPL)	
10	Hollow Stem Auger	(6)	9					
				7			14" Red/Brown Silty SAND	
11					8		2" Gray coarse Sandy GRAVEL (W-NPL)	
						8		
12		(7)	12					
				7			3" DITTO	
13					8		6" Red and Brown Clayey SILT w/Organic (M-PL)	
						8	10" Layered Silty fine SAND and Clayey SILT (M-LPL)	
14		(8)	2					
				1				
15					2		16" Brown/Gray Silty fine SAND w/thin layers	
						5	Gray and Red/Brown Clayey SILT (W-LPL)	
16		(9)	3					
				1				
17					3		24" Gray Brown Silty SAND (W-NPL)	
						7		
18		(10)	4					
				8				
19					3		16" Gray/Brown Silty SAND w/thin layer Gray Clayey SILT	
						6	(M/W-NPL)	
20		(11)	wor					
				1			16" Brown Silty SAND	
21					1		5" Gray Silty fine SAND (M/W-NPL)	
						6		
22		(12)	5					
				8			18" Gray Silty fine SAND w/thin layers fine Sandy SILT	
23					9		(M/W-NPL)	
						9		
24		(13)	wor				Brown Silty SAND (sloughed)	
25				1				

(continued next sheet)

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CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR B. Bosworth/R. Varriale
SOIL & ROCK DESCRIP. J. Curtis/D. Page
REGIONAL SOILS ENGR. -
SHEET 1 OF 3
STRUCTURE NAME/NO. Bouy 212

HOLE D-2

SM 282e (2/78)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Washington
PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Bouy 212
SOIL SERIES -
COORD. LOC. -
DATE START 4/16/90 DATE FINISH 4/17/90

HOLE D-2
LINE N-P BL
STA 9+23
OFFSET 25' Rt.
SURF. ELEV. 131.04'
DEPTH TO WATER 8' ±

CASING O.D. Auger I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
25								
		13			1		(continued from previous sheet)	
26						1	12" Layered Gray fine Sandy SILT & Gray Clayey SILT (M/W-LPL)	
		14	1				16" Gray Silty fine SAND	
27				4			3" Gray Clayey SILT (M/W-NPL)	
					4		3" Gray Silty fine SAND	
28						9		
		15	wor					
29				1			18" Gray SAND (Possible Slough Material)	
					2		4" Gray Silty fine SAND (M/W-NPL)	
30						3		
		16	wor					
31				wor			Gray Silty SAND (W-NPL)	
					2			
32						1		
		17	wor					
33				4			DITTO	
					7			
34						8		
		18	wor					
35				wor			DITTO	
					1			
36	Hollow Stem Auger					5		
		19	4				12" DITTO	
37				11				
					15		12" Gray Silty fine SAND	
38						12		
		20	3				End 4/16 Start 4/17 - Note: Broke Rope	
39				4			attempting to pull auger plug. Took out 2	
					4		8" DITTO lengths of augers. Then pulled out rods and	
40						5	plug. Replaced augers to 38', then washed	
		21	6				out.	
41				10			24" DITTO w/2 Thin Layers Gray Clayey SILT (M-LPL)	
					9			
42						16		
		22	2					
43				5			24" DITTO w/3 Layers Gray Clayey SILT 1" THICK (W-LPL)	
					11			
44						21		
		23	3					
45				8			12" Slough	
					8		12" Layered Gray Silty fine SAND, Sandy SILT & Silty CLAY (M-LPL)	
46						9	Note: Went to get additional augers	
		24	2					
47				8			Gray CLAY (M-ST-PL)	
					16			
48						15		
		25	13				14" Slough (Gray/Brown SAND)	
49				13				
					12		8" Gray CLAY (M-ST-PL)	
50						13		

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CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR B. Bosworth/R. Varriale
SOIL & ROCK DESCRIP. J. Curtis/D. Page
REGIONAL SOILS ENGR. -
SHEET 2 OF 3
STRUCTURE NAME/NO. Bouy 212

HOLE D-2

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Washington
PIN 1940.35.101
PROJECT Hudson River Dredge Disposal Sites - Bouy 212
SOIL SERIES -
COORD. LOC. -
DATE START 4/16/90 DATE FINISH 4/17/90

HOLE D-2
LINE M-P BL
STA 9+23
OFFSET 25' Rt.
SURF. ELEV. 131.04'
DEPTH TO WATER 8' ±

CASING O.D. Auger I.D. 4-1/4" WEIGHT OF HAMMER - CASING - LBS. HAMMER FALL - CASING -
SAMPLER O.D. 2" I.D. 1-3/8" WEIGHT OF HAMMER - SAMPLER 140 LBS. HAMMER FALL - SAMPLER 30"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
50		26	2					
51				4			Gray CLAY w/Thin Layers Gray Clayey SILT (M-FM-PL)	
					2			
52						4		
53							END OF HOLE @ 52.0'	
54								
55								

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO AUTHORIZED USERS ONLY THAT THEY MAY HAVE ACCESS TO THE SAME INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF SUCH AUTHORIZED USERS.

CONTRACTOR Empire Soils SM DEC Contract

DRILL RIG OPERATOR B. Bosworth/R. Varriale
SOIL & ROCK DESCRIP. J. Curtis/D. Page
REGIONAL SOILS ENGR. -
SHEET 3 OF 3
STRUCTURE NAME/NO. Bouy 212

HOLE D-2

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Saratoga
PIN 1940.46.101
PROJECT Fort Edward-Monitoring Well
SOIL SERIES
COORD. LOC.
DATE START 12/6/79 DATE FINISH 12/7/79
4" Auger

HOLE DN X-1
LINE B
STA 3+40
OFFSET 440' Lt.
Special Area 13
SURF. ELEV. 116.9
DEPTH TO WATER 1
Sketch on back

CASING O.D. ____ I.D. ____ WEIGHT OF HAMMER - CASING ____ LBS. HAMMER FALL - CASING ____
SAMPLER O.D. ____ I.D. ____ WEIGHT OF HAMMER - SAMPLER ____ LBS. HAMMER FALL - SAMPLER ____

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0		J1	Auger				Dr. Br.	76
2							Organic silt w/fibers. Wet, Non Plastic	
							Dr. Br.	
							Organic silty sand. Wet, Non Plastic	
		J2	Auger					52
7							End 7'	
							Used 4" auger	
							Set 3" Plastic Pipe at 6'	

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CONTRACTOR ____ SM ____

DRILL RIG OPERATOR Sanders
SOIL & ROCK DESCRIP. Friday
REGIONAL SOILS ENGR. John L. Ramsey
SHEET 1 OF 1
STRUCTURE NAME/NO.

HOLE DN X-1

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Saratoga
PIN 1940.46.101
PROJECT Fort Edward Monitoring Well
SOIL SERIES
COORD. LOC.
DATE START 12/10/79 DATE FINISH 12/13/79

HOLE DN X-2
LINE B Bk Tan Prod.
STA 12+44
OFFSET 411' Lt.
Special Area 13
SURF. ELEV. 124.2
DEPTH TO WATER 4'
Sketch on back

CASING H.W. O.D. I.D. WEIGHT OF HAMMER - CASING 300 LBS. HAMMER FALL - CASING 18"
SAMPLER O.D. 2.0" I.D. 1.4" WEIGHT OF HAMMER - SAMPLER 300 LBS. HAMMER FALL - SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0	14	J1	3	3	4		Dr. Br. Grave-ly Sand Silty Moist, Non Plastic	11
2	16							
	12						Dr. Br.	
	19						Sandy gravel silty Wet, Non Plastic	
	18							
	21	J2	3	3	5			10
	20							
	23							
	27							
10	22						End 10'	
							Set 3" Plastic Pipe at 9'	

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CONTRACTOR _____ SM _____

DRILL RIG OPERATOR Sanders
SOIL & ROCK DESCRIP. Friday
REGIONAL SOILS ENGR. John L. Ramsey Jr.
SHEET 1 OF 1
STRUCTURE NAME/NO.

HOLE D.N. X-2

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Saratoga
PIN 1940.46.101
PROJECT Fort Edwart Monitoring Well
SOIL SERIES
COORD. LOC.
DATE START 12/13/79 DATE FINISH 12/17/79

HOLE DN X-3
LINE B
STA 18+01
OFFSET 28' Lt.
SURF. ELEV. 121.7'
DEPTH TO WATER 5'
Special Area 13
Sketch on back

CASING H.W. O.D. I.D. WEIGHT OF HAMMER - CASING 300 LBS. HAMMER FALL - CASING 18"
SAMPLER O.D. 2.0" I.D. 1.4" WEIGHT OF HAMMER - SAMPLER 300 LBS. HAMMER FALL - SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0								
	10	J1	3	1	3		Dr. Br. Sandy silt w/fibers Moist, Non Plastic	2.1
2	16							
	10						Gr. Br.	
	11						Clayey silt Moist, Plastic	
	13							
	14	J2	3	2	3			2.6
	15							
	12							
9	11							
10	13						Gr. gravelly sand clayey moist, Low Plastic	
		J3	3	4	3			13
11.5								
							End 11.5	
							Set 3" Plastic Pipe at 10'	

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CONTRACTOR SM

DRILL RIG OPERATOR Sanders
SOIL & ROCK DESCRIP Friday
REGIONAL SOILS ENGR. John P. Rumney
SHEET 1 OF 1
STRUCTURE NAME/NO.

HOLE D.N. X-3

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1 | COUNTY Saratoga | PIN 1940.46.101 | PROJECT Fort Edward Monitoring Well | SOIL SERIES | COORD. LOC. | DATE START 11/30/79 | DATE FINISH 12/5/79

Special Area 13

HOLE DN X-4 | LINE B | STA 1+54 | OFFSET 17.5 Lt. | SURF. ELEV. 128.4 | DEPTH TO WATER 2' | Sketch on back

CASING O.D. H.W. I.D. WEIGHT OF HAMMER - CASING 300 LBS. HAMMER FALL - CASING 18"

SAMPLER O.D. 2.0" I.D. 1.4" WEIGHT OF HAMMER - SAMPLER 300 LBS. HAMMER FALL - SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0	7	J1	1	2	2		Br. Organic Sandy silt w/fibers Moist, Non Plastic	32
2	9							
	9						Dr. Br.	
	10						Organic sandy silt Moist, Non Plastic	
	11							
	11	J2	2	3	3			27
	12							
	17							
9	19							
10	64						Dr. Br. Organic silty sand gravelly	
		J3	3	4	3		Wet, Non Plastic	19
11.5								
							End. 11.5	
							Set 3" Plastic Pipe at 7'	

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CONTRACTOR _____ SM _____

DRILL RIG OPERATOR Sanders
SOIL & ROCK DESCRIP. Friday
REGIONAL SOILS ENGR. John S. Rumsey
SHEET 1 OF 1
STRUCTURE NAME/NO.

HOLE D.N. X-4

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Washington
PIN 1940.46.101
PROJECT Fort Edward Monitoring Well
SOIL SERIES
COORD. LOC.
DATE START 12/21/79 H.W.
DATE FINISH 12/24/79

HOLE DN X-5
LINE E. ℄ over fill
STA 30+76
OFFSET 22' Rt.
SURF. ELEV. 82.1
DEPTH TO WATER 3'

Buoy Area 212

Sketch on back

CASING O.D. ____ I.D. ____ WEIGHT OF HAMMER - CASING 300 LBS. HAMMER FALL - CASING 18"
SAMPLER O.D. 2.0" I.D. 1.4" WEIGHT OF HAMMER - SAMPLER 300 LBS. HAMMER FALL - SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	.5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0	6	J1	3	3	3		Br. Sandy silt w/fibers. Moist, Non Plastic	25
2	8							
	8						Br.	
	9						Sandy gravel Wet, Non Plastic	
	7							
	8	J2	4	3	4			24
	8							
	10							
	12							
10	13							
							End 10'	
							Set 3" Plastic Pipe at 8'	

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CONTRACTOR ____ SM ____

DRILL RIG OPERATOR Sanders
SOIL & ROCK DESCRIP. Friday
REGIONAL SOILS ENGR. John C. Rumney
SHEET 1 OF 1
STRUCTURE NAME/NO.

HOLE DN X-5

SM 282e (2/76)

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

SUBSURFACE EXPLORATION LOG

REGION 1
COUNTY Washington
PIN 1940.46-101
PROJECT Fort Edward Monitoring Well
SOIL SERIES
COORD. LOC.
DATE START 12/18/79 DATE FINISH 12/24/79
H.W.

HOLE DN X-6
LINE E B over fill
STA 23+00
OFFSET 104' Lt.
SURF. ELEV. 76.1
DEPTH TO WATER 2'

Buoy Site 212

Sketch on back

CASING O.D. ____ I.D. ____ WEIGHT OF HAMMER - CASING 300 LBS. HAMMER FALL - CASING 18"
SAMPLER O.D. 2.0" I.D. 1.4" WEIGHT OF HAMMER - SAMPLER 300 LBS. HAMMER FALL - SAMPLER 18"

DEPTH BELOW SURFACE	BLOWS ON CASING	SAMPLE NO.	BLOWS ON SAMPLER 0/.5	5/1.0	1.0/1.5	1.5/2.0	DESCRIPTION OF SOIL AND ROCK	MOIST. CONT. %
0								
	6	J1	3	2	3		Dr. Br. Organic Sandy silt w/fibers	77
2	8						Moist, Non Plastic	
	5						Br.	
	6						Sandy silt Wet, Non Plastic	
	7							
	8	J2	2	2	2			23
	5							
	7							
	9							
10	13							
							End 10'	
							Set 3" Plastic Pipe at 7'	

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CONTRACTOR ____ SM ____

DRILL RIG OPERATOR Sanders
SOIL & ROCK DESCRIP. Friday
REGIONAL SOILS ENGR. John D. Rumney
SHEET 1 OF 1
STRUCTURE NAME/NO.

HOLE DN X-6

APPENDIX C

HISTORY OF EXISTING MONITORING WELLS

APPENDIX C

HISTORY OF EXISTING MONITORING WELLS

The following outline is a brief chronology of events concerning the installation and subsequent replacement of six monitoring wells at the subject sites. In many cases statements from correspondence are quoted verbatim. In other cases, only general information from certain correspondence is included.

- A Malcolm Pirnie Interim Report to Mr. Eldred Rich of the NYS Department of Conservation (NYSDEC) dated August 25, 1975, recommends the installation and periodic sampling of observation wells at the spoil sites. It says that the "locations and characteristics of the ... wells will be governed by the specific hydrogeologic conditions at the spoil sites." These wells would be used to monitor PCB levels at the spoil sites.

- November 7, 1979 memorandum from the New York State Department of Transportation (NYSDOT) Soil Mechanics Bureau (SMB) to Region 1 Director C. Carlson, requesting that six wells be installed at the sites: four at Special Area 13 (SA-13) and two at Bouy 212 (B-212). The memo states, "The wells should consist of 3 inch inside diameter slotted plastic pipe ... progressed to a depth of 5 feet below water table ... It is anticipated that the wells will average 10 feet in depth." SMB requested that these wells be installed prior to December 14, 1979. The memo also states that representatives from NYSDEC, SMB and the NYSDOT Waterways Maintenance Division (WMD) should locate the wells.

- From November 30, 1979, to December 24, 1979, borings DNX-1 thru DNX-6 were progressed at the two sites. The logs indicate the depth to water was from one foot (DNX-1) to five feet (DNX-3) below original ground surface, and that a three inch slotted plastic pipe was progressed five feet below the indicated depth to water. The slotted pipe was also one foot above the bottom of the hole (as per typical groundwater monitoring well section).

- January 14, 1981 memorandum from SMB to WMD noting that SMB has reviewed difficulties encountered in Observation Wells 4 and 5 with Dr. Tofflemire of NYSDEC and, in order to meet his (Dr. Tofflemire's) requirements, it will be necessary to install wells which will be sand-packed well point systems. Two inch inside diameter flush thread joint pipe (Schedule 80) was ordered: two five foot screens, eight five foot solid pipes and two threaded caps.

- January 20, 1981 memorandum from SMB to C. Carlson requesting Wells 4 and 5 be replaced. NYSDEC has requested these be replaced in order to provide the necessary sampling as required by the United States Environmental Protection Agency (EPA) monitoring orders for these disposal sites.

  The memo reads, "We request that these be progressed to a depth of 20 feet and be of the sand packed well point type. The necessary supplies have been requested from the Waterways Maintenance Division ...".

- April 27, 1981 memorandum from Dr. Tofflemire (NYSDEC) to Mr. Stellato (WMD Director) which reads, "I understand NYSDOT will be installing new

wells ... because these wells were dry. It is also requested that ... No. 3 at SA-13 site be replaced because of high turbidity in the water".

- May 7, 1981 handwritten note to JR (assumed to be John Rumsey, NYSDOT Region 1 Soils Engineer) from an unknown source (signature is illegible) reads "As per W. Schollenburg (assumed to be William Schollenberger, WMD Engineer) - #3 well replacement was deleted until results of #4 and #5 are received.

  "Well point not needed -

  Encon (NYSDEC) and Waterways (WMD) decided this but did not let us (SMB) know."

- September 3, 1982 memorandum from WMD to D. Geoffroy, NYSDOT Region 1 Director, states that in 1981 Regional forces replaced wells Nos. 4 and 5, and that NYSDEC is now requesting wells Nos. 2, 3 and 6 also be replaced.

- September 28, 1982 memorandum from WMD to Geoffroy states that the EPA requires that well No. 1 also be reconstructed, and requests NYSDOT Region 1 personnel to do the work.

- October 25, 1982 memorandum from J.P. Rumsey, Region 1 Soils Engineer to WMD, ordering 60 linear feet of six inch casing to replace wells Nos. 1, 2, 3 and 6. This memo states that "We will only install the outer shell of the observation wells."

- January 26, 1984 message from Geoffroy to Rumsey asking if the installation of EPA monitoring well (unspecified) was done yet. Rumsey replied that the installation of the wells was completed on February 6, 1984.

- Undated memorandum from Rumsey to SMB stating that copies of logs of Drill Holes 4R & 5R are transmitted herewith (no logs found in 1990).

- Undated memorandum from Rumsey to WMD stating that copies of logs of Drill Holes DNW 1R, 2R, 3R, and 6R are transmitted herewith (no logs found in 1990).

APPENDIX D

PCB LABORATORY ANALYSIS RESULTS

SPECIAL AREA 13 SPOIL SITE - Total P.C.B. (ug/l=ppb)

SAMPLE DATE	PCB CODE	DNGRD. WELL # 1	DNGRD. WELL # 2	DNGRD. WELL # 3	UPGRD. WELL # 4
10/01/80	1	2.40	0.00 NST	2.90	0.00 NST
10/01/80	2	LT 0.05	0.00 NST	LT 0.05	0.00 NST
10/01/80	6	0.10	0.00 NST	1.10	0.00 NST
10/01/80	7	LT 0.05	0.00 NST	LT 0.05	0.00 NST
04/20/81	1	0.00 NST	0.19	0.53	0.00 NST
04/20/81	2	0.00 NST	LT 0.05	LT 0.05	0.00 NST
04/20/81	6	0.00 NST	LT 0.05	LT 0.05	0.00 NST.
04/20/81	7	0.00 NST	LT 0.05	LT 0.05	0.00 NST
04/30/81	1	LT 0.05	0.00 NST	0.00 NST	0.00 NST
04/30/81	2	LT 0.05	0.00 NST	0.00 NST	0.00 NST
04/30/81	6	LT 0.05	0.00 NST	0.00 NST	0.00 NST
04/30/81	7	LT 0.05	0.00 NST	0.00 NST	0.00 NST
05/04/81	1	0.00 N.D.	0.19.	0.53	2.80
05/04/81	8	LT 0.05	0.00 N.D.	0.00 N.D.	0.00 N.D.
06/17/81	1	0.00 NST	0.00 NST	LT 0.33	2.80
06/17/81	2	0.00 NST	0.00 NST	LT 0.05	LT 0.05
06/17/81	6	0.00 NST	0.00 NST	LT 0.12	LT 0.12
06/17/81	7	0.00 NST	0.00 NST	LT 0.05	LT 0.05
07/13/81	1	0.00 NST	0.00 NST	0.45	1.10
07/13/81	2	0.00 NST	0.00 NST	LT 0.05	LT 0.05
07/13/81	6	0.00 NST	0.00 NST	LT 0.05	LT 0.05
07/13/81	7	0.00 NST	0.00 NST	LT 0.05	LT 0.05
08/24/81	1	0.00 NST	0.00 NST	0.54	22.00
08/24/81	2	0.00 NST	0.00 NST	LT 0.05	LT 5.40
08/24/81	6	0.00 NST	0.00 NST	LT 0.05	LT 5.40
08/24/81	7	0.00 NST	0.00 NST	LT 0.05	LT 5.40
09/16/81	1	0.00 NST	0.00 NST	LT 0.07	LT 0.11
09/16/81	2	0.00 NST	0.00 NST	LT 0.06	LT 0.05
09/16/81	6	0.00 NST	0.00 NST	LT 0.05	LT 0.05
09/16/81	7	0.00 NST	0.00 NST	LT 0.05	LT 0.05
10/16/81	1	0.00 NST	0.00 NST	11.00	0.00 NST
10/16/81	2	0.00 NST	0.00 NST	LT 0.53	0.00 NST
10/16/81	6	0.00 NST	0.00 NST	1.20	0.00 NST
10/16/81	7	0.00 NST	0.00 NST	LT 0.53	0.00 NST
06/15/82	1	0.00 NST	LT 0.15	LT 0.29	LT 0.07
06/15/82	2	0.00 NST	LT 0.15	LT 0.29	LT 0.07
06/15/82	6	0.00 NST	LT 0.15	LT 0.29	LT 0.07
06/15/82	7	0.00 NST	LT 0.15	LT 0.29	LT 0.07
07/13/82	1	0.00 NST	2.30	2.50	LT 0.08
07/13/82	2	0.00 NST	LT 0.33	LT 0.31	LT 0.08
07/13/82	6	0.00 NST	LT 0.33	LT 0.31	LT 0.08
07/13/82	7	0.00 NST	LT 0.33	LT 0.31	LT 0.08
05/25/84	1	0.00 N.D.	0.00 N.D.	0.22	0.18
05/25/84	8	LT 0.05	LT 0.05	0.00 N.D.	0.00 N.D.
06/27/84	1	0.00 N.D.	0.00 N.D.	0.13	0.00 N.D.
06/27/84	5	0.00 N.D.	0.00 N.D.	0.00 N.D.	1.10
06/27/84	8	LT 0.05	LT 0.05	0.00 N.D.	0.00 N.D.
08/01/84	5	0.00 N.D.	0.00 N.D.	0.34	0.66
08/01/84	8	LT 0.06	LT 0.06	0.00 N.D.	0.00 N.D.
08/28/84	1	0.00 N.D.	0.00 N.D.	0.20	0.13
08/28/84	8	LT 0.06	LT 0.06	0.00 N.D.	0.00 N.D.
09/25/84	8	LT 0.05	LT 0.05	LT 0.06	0.00 N.D.
10/30/84	1	0.00 N.D.	0.00 N.D.	0.07	0.30
10/30/84	8	LT 0.06	LT 0.06	0.00 N.D.	0.00 N.D
11/28/84	1	0.00 N.D.	0.06	0.08	0.00 N.D.
11/28/84	5	0.00 N.D.	0.00 N.D.	0.00 N.D.	0.80
11/28/84	8	LT 0.06	0.00 N.D.	0.00 N.D.	0.00 N.D.
05/09/85	1	0.00 N.D.	0.10	0.10	0.00 N.D.
05/09/85	5	0.50	0.00 N.D.	0.00 N.D.	0.00 N.D.
05/09/85	8	0.00 N.D.	0.00 N.D.	0.00 N.D.	LT 0.06
07/02/85	5	0.20	0.00 N.D.	0.00 N.D.	0.00 N.D.
07/02/85	8	0.00 N.D.	LT 0.05	LT 0.05	LT 0.05
10/22/85	8	LT 1.00	LT 0.50	LT 0.50	LT 0.50
12/17/85	4	0.17	0.00 N.D.	0.00 N.D.	0.00 N.D.
12/17/85	8	0.00 N.D.	LT 0.50	LT 0.50	LT 1.00

08/25/86	1-4		0.00	N.D.		0.00	N.D.		0.00	N.D.	
08/25/86	5		3.80			0.00	N.D.		0.00	N.D.	
08/25/86	6-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
09/15/86	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
11/18/86	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
12/17/86	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
06/17/87	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
07/27/87	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
08/24/87	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
09/23/87	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
10/20/87	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
11/17/87	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
01/21/88	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
03/30/88	1-4		0.00	N.D.		0.00	N.D.		0.00	N.D.	
03/30/88	5		0.45			0.00	N.D.		0.00	N.D.	
03/30/88	6-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
04/27/88	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
05/26/88	1-3		0.00	N.D.		0.00	N.D.		0.00	N.D.	
05/26/88	4		0.30			0.00	N.D.		0.00	N.D.	
05/26/88	5-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
06/23/88	1-4		0.00	N.D.		0.00	N.D.		0.00	N.D.	
06/23/88	5		1.40			0.00	N.D.		0.00	N.D.	
06/23/88	6-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
07/26/88	1-2		0.00	N.D.		0.00	N.D.		0.00	N.D.	
07/26/88	3		0.89			0.00	N.D.		0.00	N.D.	
07/26/88	4-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
08/25/88	1-3		0.00	N.D.		0.00	N.D.		0.00	N.D.	
08/25/88	4		0.66			0.00	N.D.		0.00	N.D.	
08/25/88	5-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
09/22/88	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
10/31/88	1-7		0.00	N.D.		0.00	N.D.		0.00	N.D.	
11/28/88	1-7	LT	0.05		LT	0.05		LT	0.05		LT 0.05

PCB CODES

1 - Results Quantitated as Aroclor 1016
2 - Results Quantitated as Aroclor 1221
3 - Results Quantitated as Aroclor 1232
4 - Results Quantitated as Aroclor 1242
5 - Results Quantitated as Aroclor 1248
6 - Results Quantitated as Aroclor 1254
7 - Results Quantitated as Aroclor 1260
8 - Results Quantitated as Total PCB's

Note: Upstream well #4 was replaced in 1991. Well #4 was
proressed to a depth of 20' and sand packed.
Downstream well #'s 1-3 were replaced in February 1984.
They were progressed to depths of 9.5',11',and 12'
respectively and sand packed.

BUOY 212 SPOIL SITE - Total P.C.B. (ug/l=ppb)

SAMPLE DATE	PCB CODE	UPGRD. WELL # 5	DNGRD. WELL # 6
10/01/80	1	0.00 NST	12.00
10/01/80	2	0.00 NST	LT 0.05
10/01/80	6	0.00 NST	3.90
10/01/80	7	0.00 NST	LT 0.05
03/19/81	1	2.60	0.00 NST
03/19/81	2	LT 0.05	0.00 NST
03/19/81	6	0.46	0.00 NST
03/19/81	7	LT 0.05	0.00 NST
04/20/81	1	0.00 NST	0.72
04/20/81	2	0.00 NST	LT 0.05
04/20/81	6	0.00 NST	LT 0.05
04/20/81	7	0.00 NST	LT 0.05
05/04/81	1	0.00 NST	0.72
05/04/81	6	0.00 NST	0.05
05/04/81	6	0.00 N.D.	0.05
06/17/81	1	2.80	0.40
06/17/81	2	0.00 N.D.	LT 0.05
06/17/81	6	0.00 N.D.	LT 0.12
06/17/81	7	0.00 N.D.	LT 0.05
08/21/81	1	5.20	66.00
08/21/81	2	LT 0.11	LT 5.40
08/21/81	6	LT 0.11	LT 5.40
08/21/81	7	LT 0.11	LT 5.40
09/16/81	1	LT 0.07	LT 0.05
09/16/81	2	LT 0.05	LT 0.05
09/16/81	6	LT 0.05	LT 0.05
09/16/81	7	LT 0.05	LT 0.05
10/16/81	1	1.00	0.00 NST
10/16/81	2	LT 0.05	0.00 NST
10/16/81	6	0.13	0.00 NST
10/16/81	7	LT 0.05	0.00 NST
06/15/82	1	LT 0.06	LT 0.56
06/15/82	2	LT 0.06	LT 0.56
06/15/82	6	LT 0.06	LT 0.56
06/15/82	7	LT 0.06	LT 0.56
07/13/82	1	LT 0.07	17.00
07/13/82	2	LT 0.07	LT 1.00
07/13/82	6	LT 0.07	LT 1.00
07/13/82	7	LT 0.07	LT 1.00
05/25/84	8	LT 0.05	0.00 NST
06/27/84	5	0.00 N.D.	1.10
06/27/84	8	LT 0.05	0.00 N.D.
08/01/84	5	0.00 N.D.	0.82
08/01/84	8	LT 0.06	0.00 N.D.
08/28/84	1	0.00 N.D.	0.27
08/28/84	8	LT 0.06	0.00 N.D.
09/25/84	1	0.00 N.D.	LT 0.30
09/25/84	8	LT 0.05	0.00 N.D.
10/30/84	1	0.00 N.D.	0.60
10/30/84	8	LT 0.05	0.00 N.D.
11/28/84	8	LT 0.06	0.00 N.D.
05/09/85	1	0.30	0.00 N.D.
05/09/85	5	0.00 N.D.	6.80
07/02/85	1	0.00 N.D.	1.20
07/02/85	8	LT 0.05	0.00 N.D.
10/22/85	8	LT 0.50	LT 2.00
12/17/85	4	0.00 N.D.	0.45
12/17/85	8	LT 0.50	0.00 N.D.
08/25/86	1-4	0.00 N.D.	0.00 N.D.
08/25/86	5	0.00 N.D.	5.00
08/25/86	6-7	0.00 N.D.	0.00 N.D.
09/15/86	1-7	0.00 N.D.	0.00 N.D.
11/18/86	1-7	0.00 N.D.	0.00 N.D.
12/17/86	1-7	0.00 N.D.	0.00 N.D.
06/17/87	1-7	0.00 N.D.	0.00 N.D.
07/27/87	1-7	0.00 N.D.	0.00 N.D.
08/24/87	1-7	0.00 N.D.	0.00 N.D.
09/23/87	1-7	0.00 N.D.	0.00 N.D.
10/20/87	1-7	0.00 N.D.	0.00 N.D.
11/17/87	1-7	0.00 N.D.	0.00 N.D.

01/06/88	1-7		0.00 N.D.		0.00 N.D.
03/30/88	1-4		0.00 N.D.		0.00 N.D.
03/30/88	5		0.00 N.D.		1.20
03/30/88	6-7		0.00 N.D.		0.00 N.D.
04/27/88	1-4		0.00 N.D.		0.00 N.D.
04/27/88	5		0.00 N.D.		0.60
04/27/88	6-7		0.00 N.D.		0.00 N.D.
05/26/88	1-3		0.00 N.D.		0.00 N.D.
05/26/88	4		0.00 N.D.		0.40 0.1
05/26/88	5-7		0.00 N.D.		0.00 N.D.
06/23/88	1-4		0.00 N.D.		0.00 N.D.
06/23/88	5		0.00 N.D.		1.10
06/23/88	6-7		0.00 N.D.		0.00 N.D.
07/26/88	1-2		0.00 N.D.		0.00 N.D.
07/26/88	3		0.00 N.D.		0.66
07/26/88	4-7		0.00 N.D.		0.00 N.D.
08/25/88	1-7		0.00 N.D.		0.00 N.D.
09/22/88	1-7		0.00 N.D.		0.00 N.D.
10/31/88	1-7		0.00 N.D.		0.00 N.D.
11/28/88	1-7	LT	0.05	LT	0.05

PCB CODES

1 - Results Quantitated as Aroclor 1016
2 - Results Quantitated as Aroclor 1221
3 - Results Quantitated as Aroclor 1232
4 - Results Quantitated as Aroclor 1242
5 - Results Quantitated as Aroclor 1248
6 - Results Quantitated as Aroclor 1254
7 - Results Quantitated as Aroclor 1260
8 - Results Quantitated as Total PCB's

Note: Upstream well #5 was replaced in 1981. Well #5 was progressed to a depth of 20' and sand packed. Downstream well #6 was replaced in February 1984. Well #6 was progressed to a depth of 12' and sand packed.

PCB LAB RESULTS FOR
SPECIAL AREA 13
RESULTS IN (ppb)
NST = NO SAMPLE TAKEN

DATE OF SAMPLE	WELL NO 1	WELL NO 2	WELL NO 3	WELL NO 4	NUMBER OF SAMPLES TAKEN
10/01/80	0.62	NST	1.00	NST	4
04/20/80	NST	0.05	0.13	NST	4
04/30/80	0.00	NST	NST	NST	4
05/04/81	0.00	0.05	0.26	1.40	2
06/17/81	NST	NST	0.26	0.70	4
07/13/81	NST	NST	0.11	0.22	4
08/24/81	NST	NST	0.14	5.50	4
09/16/81	NST	NST	0.00	0.00	4
10/16/81	NST	NST	3.05	NST	4
06/15/82	NST	0.00	0.00	0.00	4
07/13/82	NST	0.58	0.62	0.00	4
05/25/84	0.00	0.00	0.11	0.09	2
06/27/84	0.00	0.00	0.04	0.37	3
08/14/84	0.00	0.00	0.14	0.20	4
09/25/84	0.00	0.00	0.00	0.00	1
10/30/84	0.00	0.00	0.04	0.15	2
11/28/84	0.00	0.02	0.03	0.27	3
05/09/85	0.17	0.03	0.03	0.00	3
07/02/85	0.10	0.00	0.00	0.00	2
10/22/85	0.00	0.00	0.00	0.00	1
12/17/85	0.08	0.00	0.00	0.00	2
08/25/86	1.27	0.00	0.00	0.00	3
09/15/86	0.00	0.00	0.00	0.00	1
11/18/86	0.00	0.00	0.00	0.00	1
12/17/86	0.00	0.00	0.00	0.00	1
06/17/87	0.00	0.00	0.00	0.00	1
07/27/87	0.00	0.00	0.00	0.00	1
08/24/87	0.00	0.00	0.00	0.00	1
09/23/87	0.00	0.00	0.00	0.00	1
10/20/87	0.00	0.00	0.00	0.00	1
11/17/87	0.00	0.00	0.00	0.00	1
01/21/88	0.00	0.00	0.00	0.00	1
03/30/88	0.15	0.00	0.00	0.00	3
04/27/88	0.00	0.00	0.00	0.00	1
05/26/88	0.10	0.00	0.00	0.00	3
06/23/88	0.47	0.00	0.00	0.00	3
07/26/88	0.30	0.00	0.00	0.00	3
08/25/88	0.22	0.00	0.00	0.00	3
09/22/88	0.00	0.00	0.00	0.00	1
10/31/88	0.00	0.00	0.00	0.00	1
11/28/88	0.00	0.00	0.00	0.00	1
05/23/89	<4	<4	<4	<4	2
06/20/89	<4	<4	<4	<4	2
09/11/89	<4	NST	<4	<4	1

PCB LAB RESULTS FOR
BUOY 212
RESULTS IN (ppb)
NST = NO SAMPLE TAKEN

DATE OF SAMPLE	WELL NO 5	WELL NO 6	NUMBER OF SAMPLES TAKEN
10/01/80	NST	3.98	4
03/19/81	0.76	NST	4
04/20/81	NST	0.18	4
05/04/81	0.00	0.27	3
06/17/81	0.70	0.10	4
08/21/81	1.30	16.50	4
09/16/81	0.00	0.00	4
10/16/81	0.28	NST	4
06/15/82	0.00	0.00	4
07/13/82	0.00	4.25	4
05/25/84	0.00	NST	1
06/26/84	0.00	0.55	2
08/01/84	0.00	0.27	4
09/25/84	0.00	0.00	2
10/30/84	0.00	0.30	2
11/28/84	0.00	0.40	2
05/09/85	0.15	3.40	2
07/02/85	0.00	0.60	2
10/22/85	0.00	0.00	1
12/17/85	0.00	0.28	2
08/25/86	0.00	1.67	3
09/15/86	0.00	0.00	1
11/18/86	0.00	0.00	1
12/17/86	0.00	0.00	1
06/17/87	0.00	0.00	1
07/27/87	0.00	0.00	1
08/24/87	0.00	0.00	1
09/23/87	0.00	0.00	1
10/20/87	0.00	0.00	1
11/17/87	0.00	0.00	1
01/06/88	0.00	0.00	1
03/30/88	0.00	0.40	3
04/27/88	0.00	0.20	3
05/26/88	0.00	0.13	3
06/23/88	0.00	0.37	3
07/26/88	0.00	0.22	3
08/25/88	0.00	0.00	1
09/22/88	0.00	0.00	1
10/31/88	0.00	0.00	1
11/28/88	0.00	0.00	1
05/23/89	<4	<4	2
06/20/89	<4	<4	2
09/11/89	<4	<4	1
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APPENDIX E

BIBLIOGRAPHY

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